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Safety

TECHNOLOGY

Grade 7

TRANSPORT

Module 1

SAFETY

Uses safe working practices and shows awareness of efficient ways of using materials and tools.

Safety procedures are a most important aspect of being in any workshop and you should make sure that you know and practise them from the start. Make sure that you know where to find the emergency button and the first aid box. Remember to report all accidents, no matter how small, to your teacher.

- Always wear an apron or overcoat to protect your clothes and sensible footwear to protect your feet.
- Take off your blazer or jersey, roll up your sleeves and tuck your tie out of the way.
- Long hair should be tied back.
- Any jewellery you may be wearing should be removed.
- Never fool around with any tools.
- Never run or play in a workshop, especially with a sharp tool in your hand.
- You are allowed to talk quietly, but you should not shout.
- You must never work alone or without permission in any workshop or practical area.
- Read all instructions for using tools carefully and make sure that you follow them.
- Take great care when carrying tools or materials. Carry sharp tools close to your body and facing downwards.
- Never misuse tools of any sort.
- Replace tools after use.
- Be sure to keep your bench and floor area tidy.

- Never use a machine without permission or the correct training.
- Never use electric tools in damp or wet conditions.
- There must never be more than one person operating or near a machine at any time.
- Clean machines after you have used them, and report any problems or damage to your teacher. Blunt or damaged items should be changed.
- When you have finished work, wash and dry your hands properly.
- Be especially thorough if you have been using oil, chemicals, paints or resins.
- Never hold the wood in your hand while you saw it with the other hand.
- Never screw into a piece of wood held in your hand.
- Never chisel towards your hand or body.
- Use a bench hook for cutting spars or dowels.
- Always keep your tools tidy and out of other people's way.

ELECTRICAL SAFETY

Much of the equipment used in class requires electrical power from either batteries or the mains. Remember that moisture and water conduct

electricity. Care should be taken when handling electronic components, such as capacitors. Batteries are best kept in separate containers when not in use. Return them at the end of the lesson. Do not put projects away with batteries in place or connected. Do not be tempted to tinker with mains electricity. If you come into contact with a live wire an electric shock or fatal accident could be the result. Electric shocks can cause severe burns and other injuries, so always take care.

Plugging IN

- Check that the appliance is switched off.
- Check that the socket is switched off.
- Make sure that the lead and plug are not damaged.
- Plug in.
- Switch on the socket.
- Switch on the appliance.

Switching OFF

- Switch off the appliance.
- Switch off the socket.
- Remove the plug from the socket.

You must not use an electrical appliance without either a teacher in the room or at least two other pupils in the room and a teacher close at hand. If you are present when a person receives an electric shock you must carry out the following procedure

- Do not touch the person.
- Send for adult help.
- Press the stop button to cut off the mains power.
- Switch off the appliance at the socket and pull out the plug.
- If this is not possible, try to push them away from the electricity. Use something made of wood which does not conduct the electricity to you.
- If you are certain that the power is off, then you can attempt to give the person first aid if you have been trained to do it.
- If you give yourself a slight electric shock you may feel weak, so relax a bit before carrying on working.

N.B.: Take good care of a person who has been injured. Keep him / her warm, let him / her lie down and call for help.

SAFETY MEASURES with regard to

SCISSORS

- A scissors must be good quality, sharp and in good working order.
- Never let the tips of the scissors close when cutting a line greater than the length of the blades.
- When cutting curves always turn the card and not the scissors.

CRAFT KNIVES

- Only to be used under very close supervision together with a metal safety ruler.
- Cut onto a suitable safety surface e.g. Very thick card/ cutting board.
- Stand when you cut and retract the blade when you need to put it away.
- The blade should not be too far out.
- You are allowed with the knife in your hand only when you are going to cut.

DRILLS

- You should know how to change twist drills, how to hold the hand drill and how to keep it at right angles to their work.
- The material to be drilled must be cramped securely.
- Do not remove the chuck completely as it is very difficult to reassemble.
- Select the appropriate twist drill – choosing one too small rather than one too big if in doubt.
- When drilling turn the handle in a clockwise direction and continue turning the same way when removing the drill bit from the hole.
- Hand drills are for holes up to 6mm in diameter; use a brace and bit for larger holes.
- Never leave a hand drill lying on a work top as it can so easily fall off and damage the twist drill.

GLUE GUNS

- Must only be used under very close supervision.
- It is suitable for wood, metals and certain plastics.
- When it is switched on and not in use ensure that it is correctly positioned on its stand.
- Switch off after use.
- Be careful of glue that drips and put it away after the gun is cooled off.

GENERAL

- When sawing plastics and metals, safety spectacles should be worn, because there is a risk of eye damage.
- Some plastics become pliable when heated but care must be taken to control the temperature because the burning of plastics is dangerous as many give off poisonous fumes.
- Polystyrene should be cut with a hot wire cutter set low and used in a well ventilated room.

SOLDERING IRONS

- Soldering irons must be treated with respect. They often use mains electricity and get very hot.

The rules for correct use are as follows:

1. Do not leave them switched on for possible future use. Always switch them off when not in use, because this will prolong the life of the

iron.

2. Never touch the mains lead with the tip of the iron. It will melt and expose bare wires which could lead to an electric shock.
3. Always use a proper soldering iron stand. Failure to do so will mean that there is a risk of the hot iron setting fire to things.
4. Avoid breathing in the resin fumes from the flux.
5. Protect the work surface with hardboard.

First aid for other injuries

Small cuts

- Wash the cut in cold water to clean it and stop the bleeding. Dry well with a clean cloth and cover it with sticky plaster to keep it clean.

SERIOUS CUTS

- Press the wound hard with a clean handkerchief, tissue or your hands to reduce the bleeding.
- Put the wound higher than the rest of your body to lessen the flow of blood.
- Find or call someone to help you.

SPLINTERS

- Sterilize tweezers or a needle in the blue part of a flame.
- Make sure you get all the splinter out.
- Then clean the wound with antiseptic liquid and cover it with sticky plaster.

BRUISES

- Wash with cold water to reduce bruising and swelling.
- A bruised fingernail may go black. If very painful, see a doctor.
- Blood blisters should be left to dry up, not popped.

During investigations, plans a strategy for collecting data and information that includes:

- using search techniques;
- extracts relevant data for specific purposes;
- produces meaningful summaries.

Activity 1:

To draw up a list of safety measures

[LO 1.11]

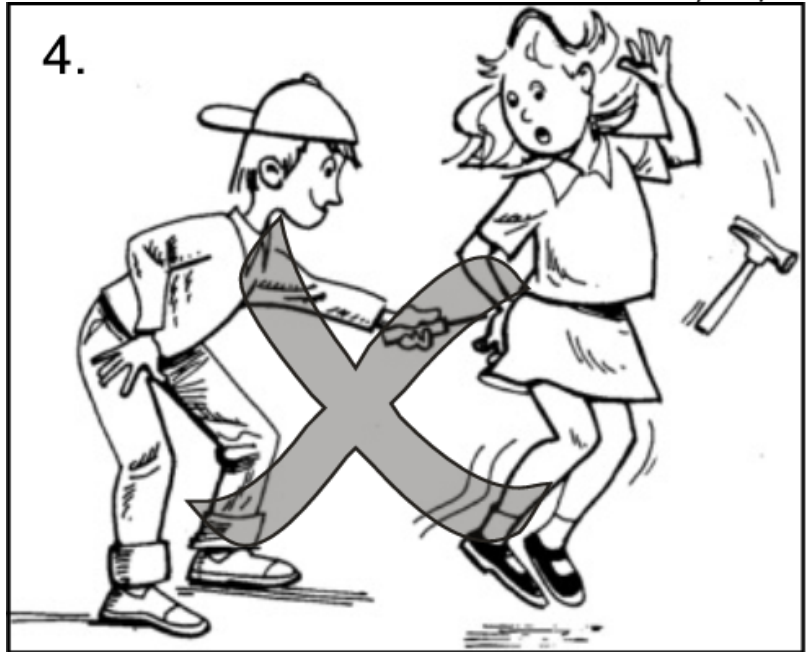
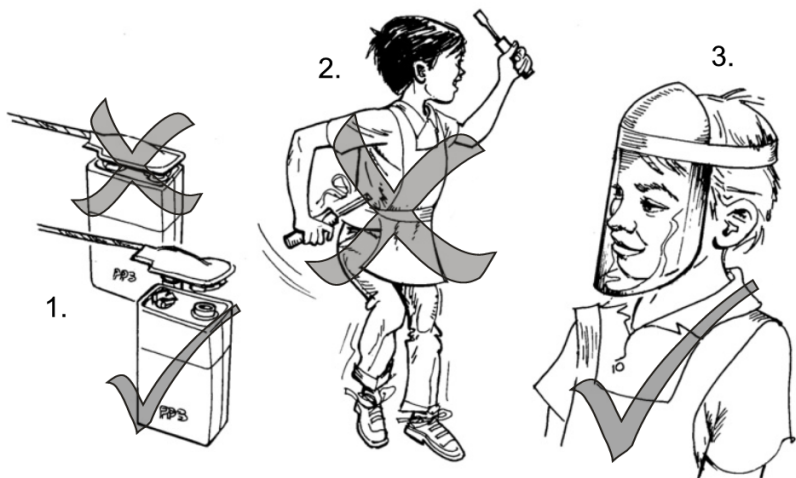
Write down five rules that you must obey with regard to wearing the correct clothing in the Technology class.

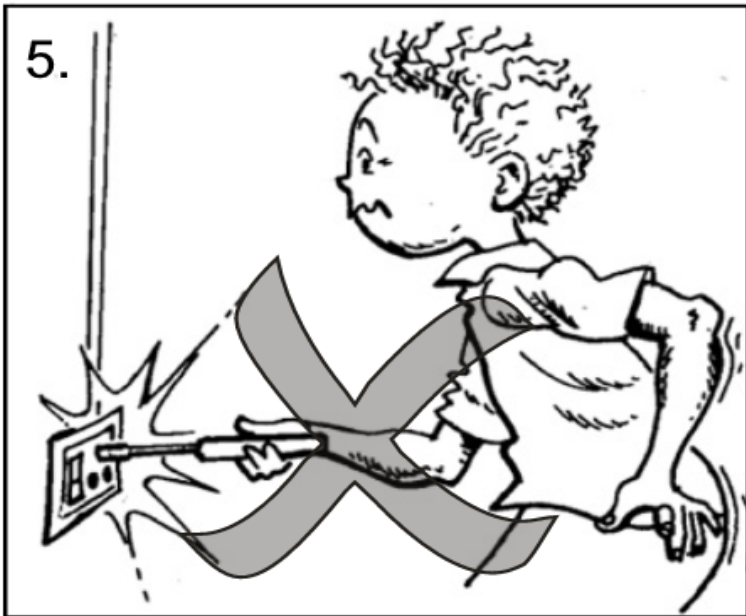
Activity 2:

To emphasise safe working practices

[LO 1.11]

Explain the rule that applies to each of the following sketches:





Activity 3:

**To write a short and clear statement
about the safe handling of tools**

[LO 1.11]

Produce a short rule with a fitting lettering design for any tool that you use in the Technology class, for example soldering irons, utility knives, glue guns, drills, saws, ex. The emphasis in the lettering type, should be that it should be easily readable, a warning and informational. The rule/s must focus on a safety aspect.

Bright colours, a bold lettering style and asymmetrical lettering would be regarded as suitable. The best examples will be laminated and put up in the class. You must use a computer or stencils for your final product.

Assessment

Learning outcomes(LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

Investigates:1.3 investigates the background

context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

Designs:1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

Makes:1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

1.11 use safe working practices and shows awareness of efficient ways of using materials and tools;

Transport

TECHNOLOGY

Grade 7

TRANSPORT

Module 2

Transport

For the teacher:

This unit can be done in groups.

Background

Planes fly at high speeds. They have large engines that let out a powerful source of air that propels the plane through the air. To illustrate quite simply how a plane or a rocket works, you can make a balloon fly.

Activity 1:

How to make a balloon fly

[LO 1.3]

Requirements:

A piece of string, about 5 m long.

Adhesive tape.

A balloon.

A drinking straw.

A clothes-peg.

Method:

Thread the piece of string through the drinking straw.

Fasten the string in two places, e.g. between two chairs so that it stretches over a distance and is stretched tightly.

Stick two pieces of adhesive tape to the drinking straw.

Inflate the balloon and close the opening with a clothes-peg. Stick the balloon to the drinking straw with the two pieces of adhesive tape.

Move the balloon to one end of the string. Let go of the balloon by removing the peg.

What are your observations?

The balloon with the string flies at a high speed.

The stream of air rushes out at the opening and pushes the balloon forward. It is a reaction to an action, i.e. the movement in one direction (air that is exhausted at the rear end) causes movement in the opposite direction (balloon moves forward).

Background: How does the engine of a plane or a rocket work?

The large blades of the turbine draw air in at the front and compress it. Fuel is burned in the air and this causes the air to heat up. Following that, the warm air is exhausted at the rear end of the engine. It causes the plane/rocket to move forward at a high speed. This reaction has been known to man for almost 2 000 years, but it was only used in an engine for the first time in 1930.

The thrust exerted by moving air or water can cause objects to perform work or can even generate electricity. Air under pressure and a liquid like water can therefore be used to make things work.

The purpose of a rocket is to get a satellite or astronauts into outer space. To achieve that, gravity, i.e. the force that attracts everything to the earth, must be overcome. If the engines of a rocket are not strong, gravity will win and will pull the rocket back to earth. If the force applied by the rocket and the gravity with which the earth attracts the rocket are equal, the rocket will continue to orbit the earth.

Activity 2:

To launch your own rocket

[LO 1.3]

For the teacher:

It is better to do this experiment outside.

Requirements:

5 ml bicarbonate of soda.

One sheet of paper towelling.

125 ml water.

125 ml vinegar.

A 2l plastic cool drink bottle.

A cork that fits tightly in the mouth of the bottle with some trimming at the top.

Method:

Put 5 ml of bicarbonate of soda exactly in the centre of the sheet of paper towelling. Roll the sheet up and fold the ends in so that the bicarbonate of soda is tucked safely inside.

Take the 2ℓ plastic bottle and put 125 ml water and 125 ml vinegar in the bottle.

Decorate the cork with a ribbon.

Put the paper towel inside the bottle and put the cork on the bottle immediately so that it fits tightly, but not too tightly.

Stand about 3 m away and see what happens.

Observation?

The cork is blown into the air like a rocket being launched..

Conclusion:

A chemical reaction between the vinegar (representing the liquid oxygen) and the bicarbonate of soda (representing the fuel) produces the gas, carbon dioxide. The air forming in the bottle exerts pressure against the cork and causes the cork to shoot up into the air. During the launching of a real rocket, the gas is exhausted from the rocket, causing it to move forward/upward.

NB: It is dangerous to play with chemicals, and irresponsible handling of these substances could lead to serious injuries as a result of explosions or burning. Therefore, be very careful. Wear goggles to protect your eyes and only work under supervision

of your educator.

Assessment

Learning outcomes(LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

Investigates:1.3 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

Making a rocket

TECHNOLOGY

Grade 7

TRANSPORT

Module 3

MAKING A ROCKET

Design and realise

Background

A rocket relies on jet propulsion in order to fly. When a rocket uses its fuel, a current of warm air is exhausted at its tail causing the rocket to move forward. Planes that fly at lower than 25 km use the oxygen in the atmosphere to ignite (burn up) their fuel.

Rockets have to carry oxygen with them, because above 25 km from the earth's surface there is not enough oxygen.

Make a Rocket

Background

We are now going to make a rocket that will use jet propulsion in order to move forward. The speed with which a rocket moves forward depends on the amount of propellant gas that is exhausted at the rear end. Water is a much better propellant than warm gas, because it is much heavier. We are going to use compressed water and air and will make observations regarding how high/far your rocket can fly.

ASSIGNMENT 1:

To find the requirements needed for the rocket

[LO 1.10]

Requirements:

- Thin cardboard.
- A pen.
- A ruler.
- Coloured cardboard.
- A pair of scissors.
- Two empty.
- 2ℓ plastic bottles.
- Strong broad adhesive tape or masking tape.
- A funnel.
- A jug of water.
- A cork.
- An air valve (from a bicycle pump).
- Plastic tube.
- A bicycle pump.
- A plastic bank coin pouch.
- A protractor.
- Glue.
- A Stanley knife.
- A stiletto or a knitting-needle.
- A pair of compasses.
- Oil-based paint.

Background

A plane or rocket operates according to Newton's third law of movement, namely if one source exerts a force on another, then the other source exerts the same amount of force on the first source, but in the opposite direction from the first source; i.e. for each action there is an opposite reaction.

If the force you exert on something is bigger than the resistance exerted by that object, the force that you exert can cause movement. The movement in the rocket is brought about by the rocket being pushed upward by the escaping gases that were generated as a result of the chemical reaction between the fuel and the oxygen that are burnt up in the combustion chambers. The large volume of gases escapes at a high speed through the rocket's steel exhaust pipe.

There are five types of force that act upon a rocket, namely:

Thrust: the force provided by the engine, which is exhausted at the rear end and which pushes the rocket forward

Gravity: the force that pulls the rocket back to earth

Resistance: This is exerted by the air against the rocket, causing the rocket to reduce its speed. (Outside the atmosphere, there is no resistance,

because there is no air.)

Lifting force: A rocket cannot be launched effectively and rise vertically unless the lifting force of its engines is greater than the weight of the rocket.

Relative wind: The air flows rapidly around the nose and down the body. Longer nose-pieces are used to get better airflow.

ASSIGNMENT 2:

To do research on the fins of a rocket

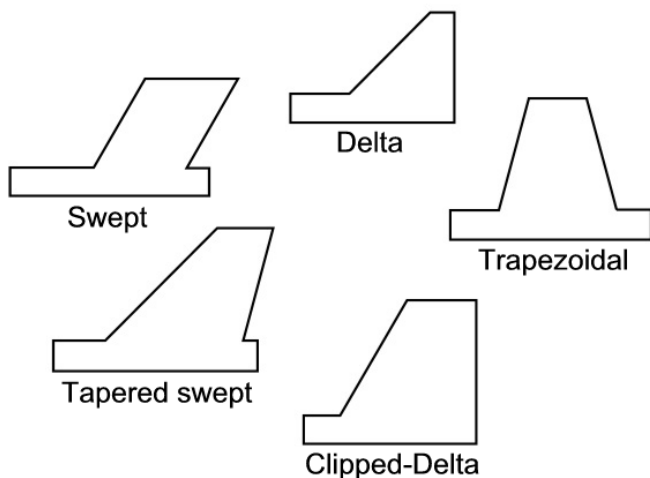
[LO 1.7]

Background

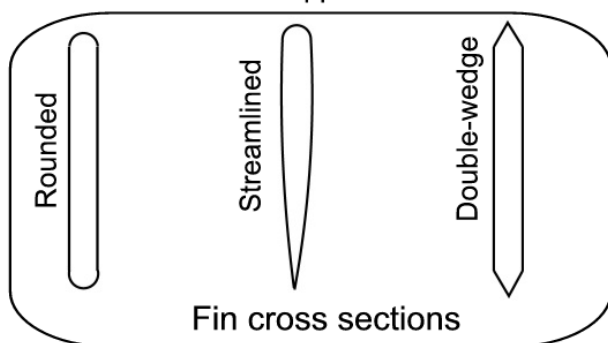
A rocket needs fins in order to fly in a straight line. Do **research** about what the fins of a rocket look like and draw a few examples in the space provided. Also decide how many fins you would like to use

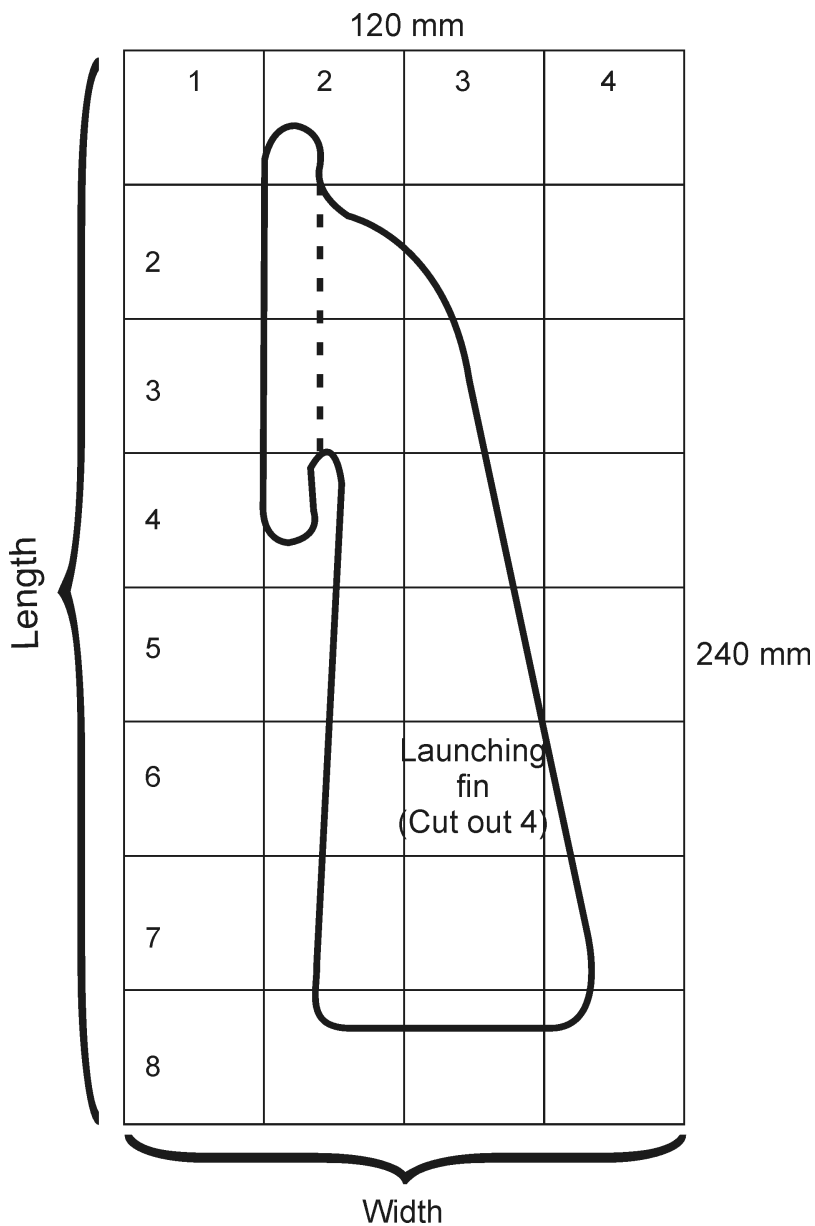
and what size the fins will have to be in relation to the body section of the rocket. Also, decide what type of material will be the most suitable for making the fins. The position of the fins on the body is also extremely important.

Fin Shapes



Top view





ASSIGNMENT 3:

[LO 1.10]

Use the sketch in Appendix 1. It is important to give the rocket tail-fins so that it will be able to stand upright for the launch (See Appendix 1). Stick the page onto cardboard. Cut out the fin. Use the template of the fin and trace four fins on thicker, more rigid cardboard. Cut them out carefully. Fold on the dotted line and stick the fins around the bottle at equal distances. (Look at the sketch to see exactly where.)

ASSIGNMENT 4:

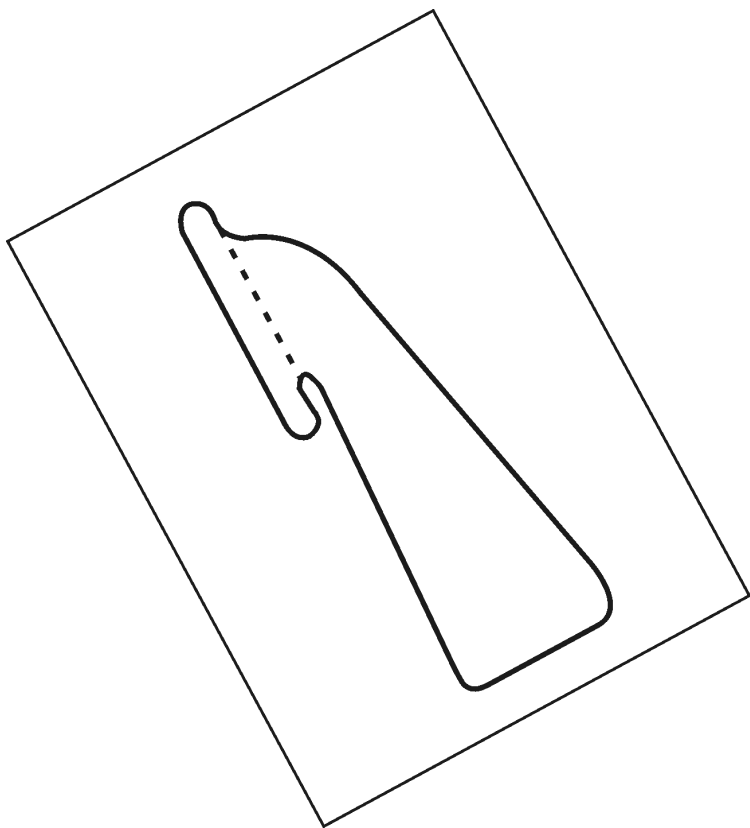
[LO 1.10]

NB:

Do you know how to enlarge this sketch of a fin according to scale/proportional to a fin of ± 20 cm?

- Draw squares across the sketch: 4 in the breadth and 8 in the length..

- In this case, each square is 5 mm by 5 mm.
- Draw squares of 30 mm by 30 mm on an A4 sheet of paper – 4 in the breadth and 8 in the length ($8 \times 30 \text{ mm} = 240 \text{ mm}$ that will give a fin of $\pm 20 \text{ cm}$).
- Now trace the pattern onto the larger squares.
- Now you have a fin of $\pm 20 \text{ cm}$



ASSIGNMENT 5:

Decide which type of body fin will be the most suitable and draw a clear freehand sketch of your choice

[LO 1.8]

ASSIGNMENT 6:

To make a final drawing (correct size with captions) of the body fin on a sheet of paper. Use it as a template to trace onto a thicker sheet of cardboard. (Use the method as explained in Assignment 4).

[LO 1.14]

ASSIGNMENT 7:

To build the body of the rocket according to the following instructions

[LO 1.14]

Instructions

Make the body of the rocket by following the instructions below. Cut one 2ℓ bottle right through along the second line just below the sticker (Sketch 1). The part that has the cork in it will be the top section of your rocket. The intact bottle with the opening pointing down forms the lower section of your rocket. You need a weight in the top section of your rocket.

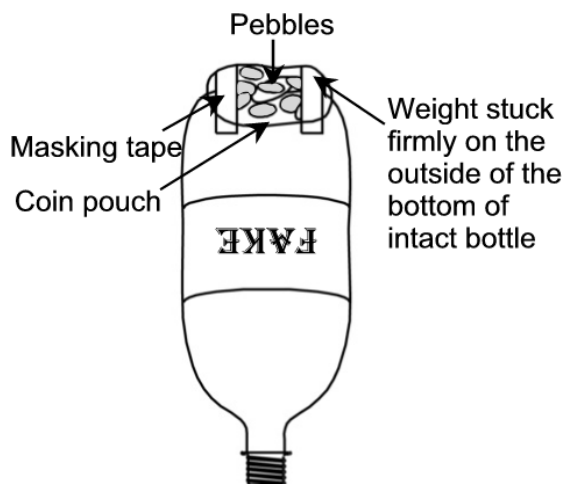
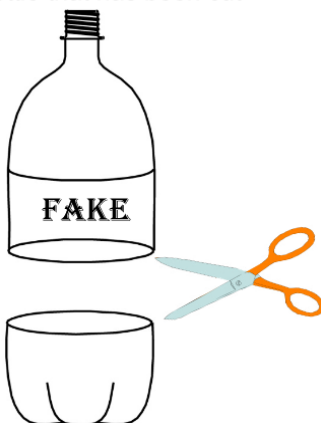
Why?

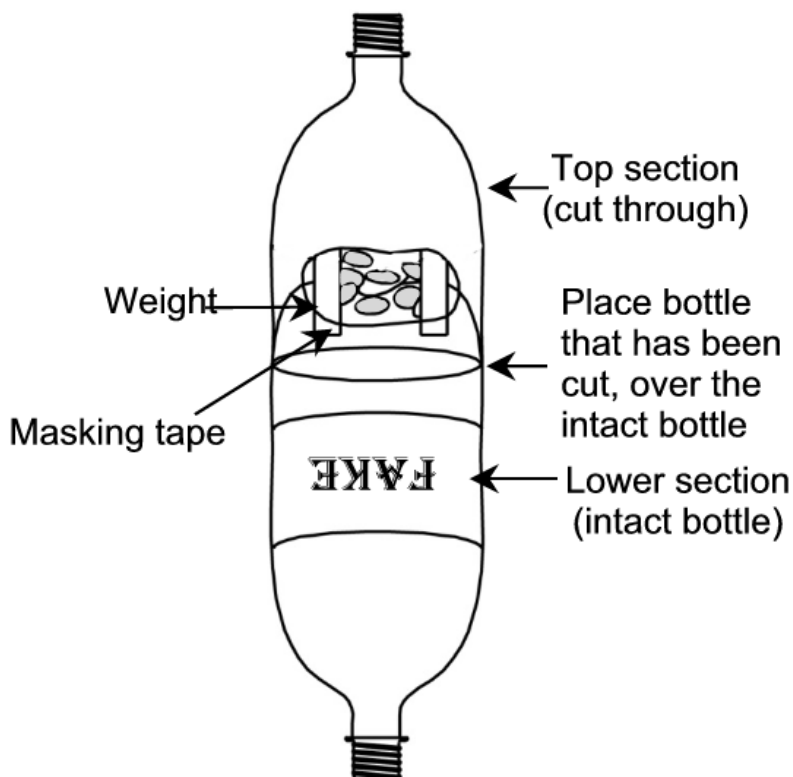
- The rocket is not balanced when the engine is in the lower section. That is the heavier section. You have to find a centre of gravity, so that the mass can be spread proportionally on both sides.
- It is therefore necessary to put something heavy in the upper section of your rocket so that the rocket can be more stable.
- When the fuel is added, the lower section of the rocket will be even heavier.
- When a rocket is stable, it continues flying vertically upwards, without overturning and losing direction.
- So put a few fairly big pebbles in a plastic bank coin pouch and stick it firmly to the bottom on the outside of the intact bottle that is being held upside-down (Sketch 2).
- Now put the top section of the bottle that has been cut through on top and stick it firmly to the intact bottle with masking tape/strong wide adhesive tape (Sketch 3).

Intact bottle



Bottle that has been cut





ASSIGNMENT 8:

In the space below, draw a top view of the position of the fins. Use a protractor and pocket calculator for correct spacing

[LO 1.14]

Now affix the fins as planned. Once the rocket has been tentatively completed, it is now necessary to find your rocket's centre of gravity and its centre of pressure.

Assessment

Learning outcomes(LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

Investigates:1.3 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

Designs:1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

Makes:1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

1.11 use safe working practices and shows awareness of efficient ways of using materials and tools;

Evaluates:1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans;

Communicates:1.14 presents ideas (in a project portfolio) using two-dimensional or three-dimensional sketches, circuit diagrams or system diagrams.

Finding a rocket's centre of gravity

TECHNOLOGY

Grade 7

TRANSPORT

Module 4

Finding the rocket's centre of gravity

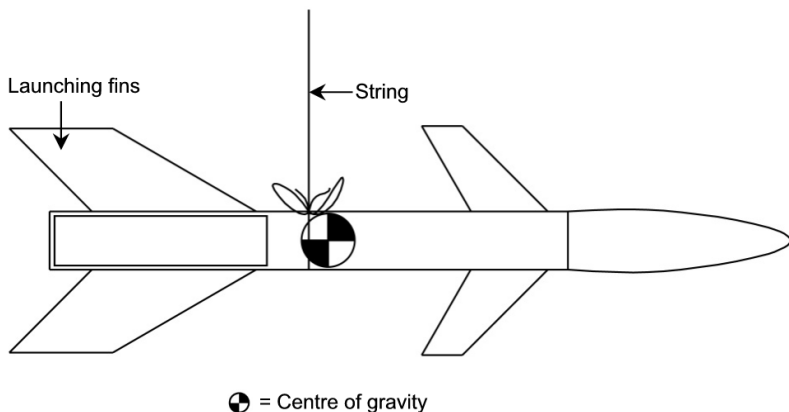
ASSIGNMENT 1:

How to find your rocket's centre of gravity

[LO 1.14]

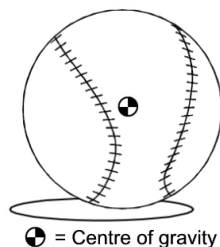
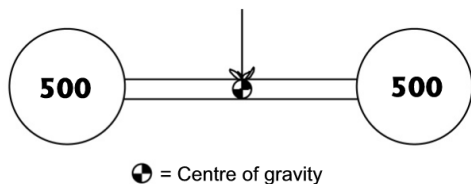
Make a loop at the end of a 1 m piece of string.

- Tie the loop around the body section of your rocket.
- Let the rocket hang free in your hand and shift the loop until the rocket hangs level/parallel to the ground.
- Indicate the centre of gravity on the rocket by drawing a line right around the body with a marking-pen. Indicate the symbol for centre of gravity.



Background

The aerodynamic forces at a rocket's centre of pressure are centred. The centre of pressure is usually also close to the tail end of the rocket. The large surface of the fins and the smooth surface of the rest of the rocket cause it to be the position where the pressure is the same on both sides. To get the centre of pressure closer to the tail of the rocket, the front section (nose) of the rocket has a more pointed shape or the body section of the rocket could be made longer, because in that way it becomes more aerodynamic. By putting smaller fins on the front section of the rocket, the centre of pressure is moved closer to the front end.



Rules: The centre of gravity should be closer to the front end of the rocket than the centre of pressure. The centre of pressure should be the same distance or longer than the diameter of the rocket from the centre of gravity to the tail end. This will make the rocket stable and will help it to fly in a straight line.

ASSIGNMENT 2:

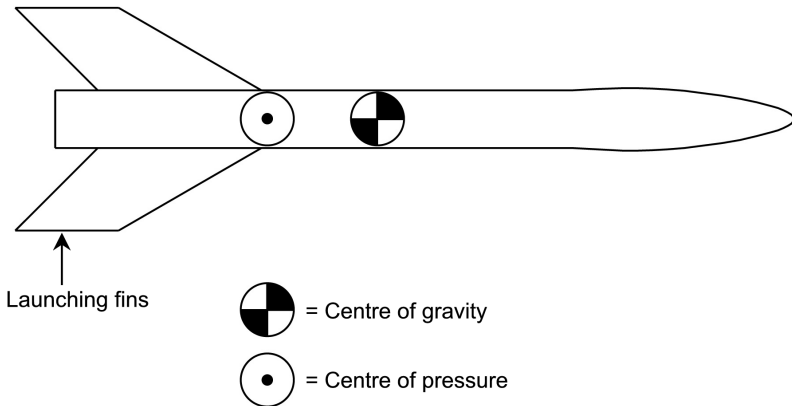
How to find a rocket's centre of pressure

[LO 1.14]

Make a sketch of the side elevation of your rocket. Sketch the fins as well and draw as accurately as possible.

- The centre of pressure is determined by drawing a line that spreads the surface of the rocket equally on both sides of the line.
- Indicate the centre of pressure in the sketch by drawing a line through it.

- Indicate the centre of pressure on the rocket by drawing a line right around the body with a marking-pen. Indicate the symbol for the centre of pressure.

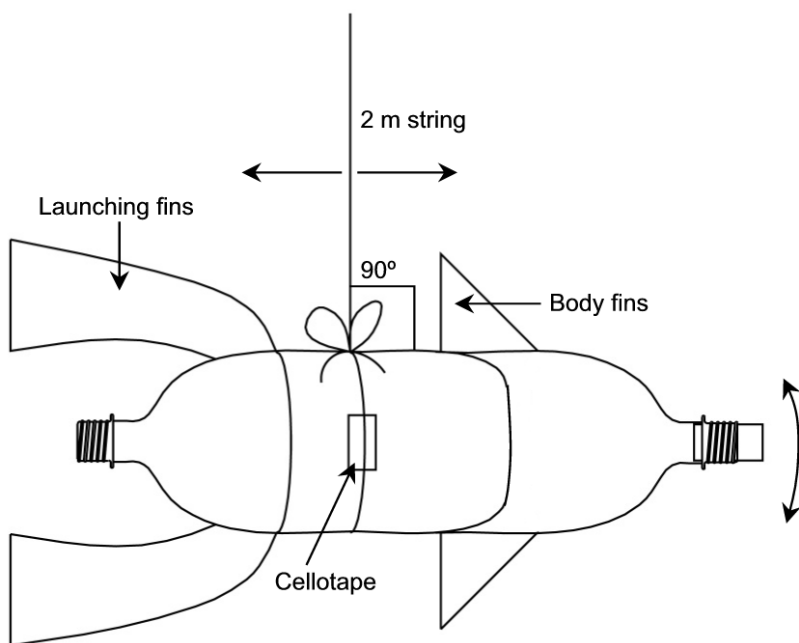


ASSIGNMENT 3:

Testing whether your rocket is stable during flight

[LO 1.13]

- Make a loop at the end of a 2 m piece of string.
- Tie the loop around your rocket at its centre of gravity. Affix the loop with adhesive tape if necessary.
- The rocket should hang parallel to the ground surface (Sketch 1). Swing it around with a circular movement (Sketch 2).
- Change the centre of gravity or the centre of pressure until your rocket swings forward in a straight line while hanging horizontally.



If you want to make any changes to your rocket to make it more stable, you can do it now. Decorate the bottles and fins so that it looks more like a rocket, for instance by painting it with an oil-based paint.

Now you are ready to launch your rocket.

Assessment

Learning outcomes(LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

Evaluates:1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans;

Communicates:1.14 presents ideas (in a project portfolio) using two-dimensional or three-dimensional sketches, circuit diagrams or system diagrams.

Memorandum

Assignment 1 - 3

Learners can help each other to find the centre of pressure and centre of gravity of every rocket. They will differ seeing that the appearance of each rocket should differ.

Launching the rocket

TECHNOLOGY

Grade 7

TRANSPORT

Module 5

LAUNCHING THE ROCKET

ASSIGNMENT 1:

Options for launching the rocket

[LO 1.11]

Option 1

- Use a stiletto or a sharp object, like a pair of compasses, to pierce a small hole through the length of a cork. Push the wide end of the air valve into the plastic tube. Push the other end of the air valve through the opening in the cork. You can try in a similar way to affix the air valve to the bottle-top. Half-fill the bottle with water .The water is the “propellant”. The compressed air above the water will provide the energy to force the rocket forward. Hold the intact bottle and push the cork with the air valve into the opening of the bottle. Push it in properly so that the cork cannot slip out of the opening. (You could rub some petroleum jelly [*Vaseline*] onto the cork, so that it will slip out easily during the launching.)

Option 1

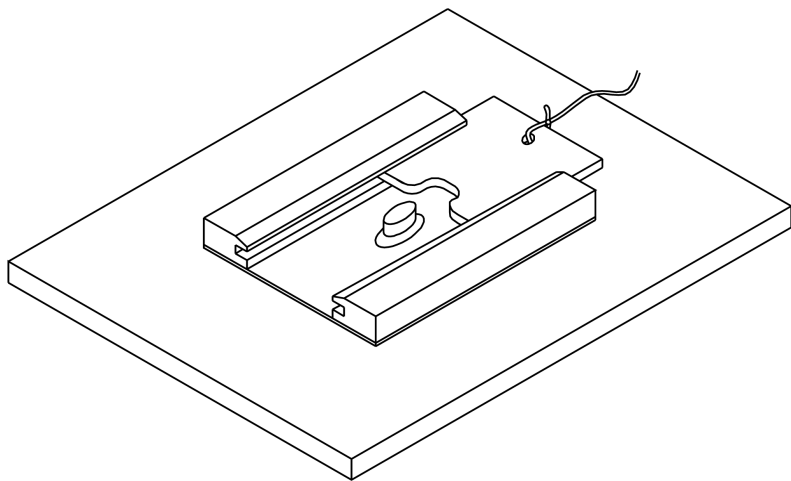
Attach the other section of the plastic tube to a bicycle pump. Turn the rocket so that the right side points upwards. Make it stand upright on the base. You are now ready to launch your rocket. Find a flat launching platform away from trees and buildings. Make the rocket stand firmly on its tail fins and have everybody stand at a distance (± 5 m). Start pumping. Air bubbles will rise through the water. When the pressure inside the bottle is high, the cork and the water will be forced out at the opening and the rocket will shoot into the air. Be careful not to bend over the rocket. Only the teacher and the learner involved should stand next to the rocket.

Option 2

For the teacher:

The launching device provides a safer option. The rocket can be launched vertically from it and the device also keeps the rocket from falling over. It is, however, necessary for you to build this launching device. You also have to test the device beforehand. (The launching fins then do not really serve their purpose.)

Option 2



Launching device

Launching instructions :

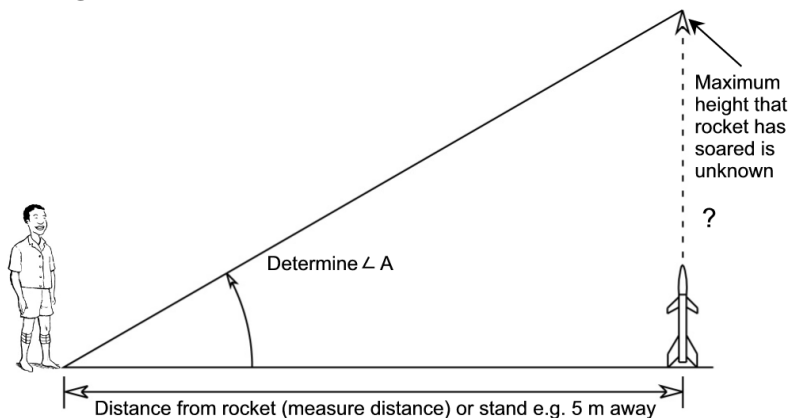
- Find a flat surface outside, away from trees and buildings.
- Half-fill the bottle with water.
- Turn the launching device at an angle and move the mouth of the rocket (opening of the bottle with water) over the wheel valve. Press the Perspex sheet round the neck of the bottle so that it will help the rocket to stand upright.
- Pump air into the bottle with a foot pump not exceeding 40 psi.
- Stand back ± 5 m and pull the Perspex sheet out.
- The rocket should shoot vertically into the air. Do not allow learners to crowd around the rocket while it is being launched. Keep onlookers at a safe distance.

ASSIGNMENT 2:

To calculate how high a rocket can fly

[LO 1.13]

Do you know that you could use a mathematical formula and scientific pocket calculator to calculate how high your rocket has travelled? How? Calculate the angle at which the rocket has soared.

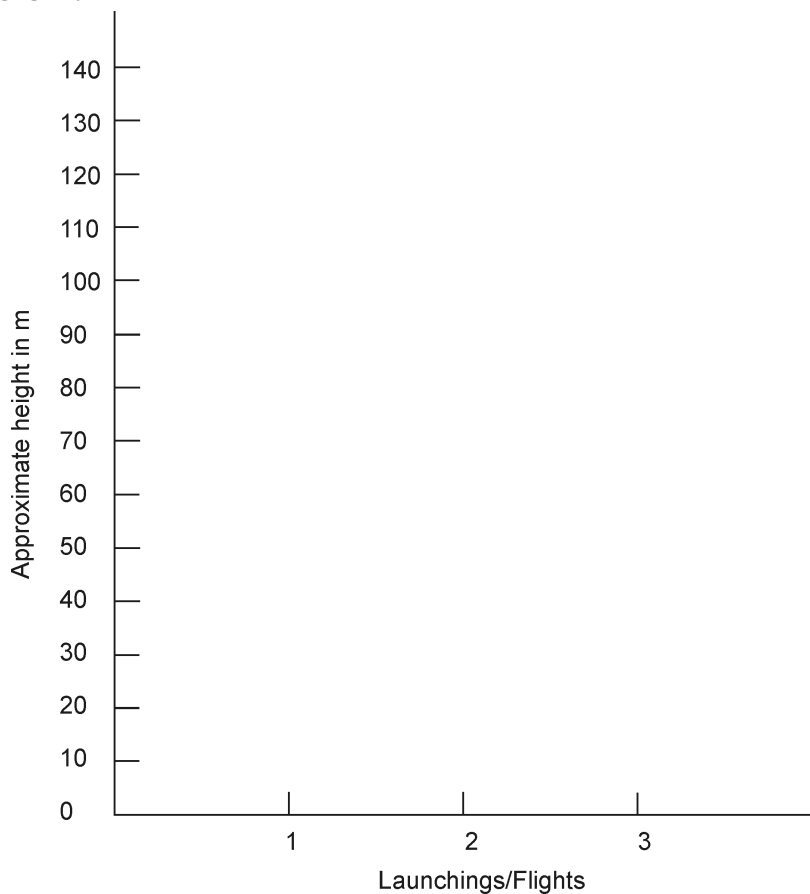


Mathematical calculation: $\tan \angle A = \frac{\text{opposite}}{\text{adjacent}}$

distance = height

e.g. $\tan 75^\circ \times 4 \text{ m} =$

Try to launch your rocket three times and record your observations in the column line linear graph below:



evaluation

ASSIGNMENT 3:

[LO 1.12]

Evaluate the appearance of your rocket after the first flight/launch with reference to the questionnaire below by putting a tick in the appropriate column next to the corresponding question. Try to make the improvements/changes if necessary to ensure more height during the 2nd and 3rd launches.

	Yes, definitely	Yes			Uncertain	No	
1. Is the conical point straight? (If it is skew, it will cause unequal airflow							

from the point to the tail, which will result in more resistance.)

2. Is there a smooth joint between the conical point and the body of the rocket? (If the diameter of the conical point is larger than the body, it will cause the airflow to be irregular, which will

--	--	--	--	--	--	--	--

increase
the air
resistance.)

3. Is the
body of
the rocket
nice and
smooth?
(Any
surface of
the
rocket,
which is
not
smooth,
will
increase
air
resistance.)

4. Are the
fins
mounted
straight
and
firmly?
(Skew
launching
fins could
hamper
the
launching

of the
rocket
and could
cause the
rocket to
be skew
during
flight.)

5. Are all
the
launching
fins of the
same size
and are
all the
other fins
also of the
same size
and do
they have
smooth
edges?
(Fins of
different
shapes
and sizes
cause
more air
resistance.)

6. Has the
finishing

been done very well and is the rocket sturdy? (A rocket that is not sturdy and properly finished off, also increases the air resistance.)

Assessment

Learning outcomes(LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

Evaluates:1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans;

Communicates:1.14 presents ideas (in a project portfolio) using two-dimensional or three-dimensional sketches, circuit diagrams or system diagrams.

Memorandum

Assignment 1

Learners can help each other to carry out option 1. A maximum altitude is the main objective at each launching. The learners and the teacher can observe which rockets achieve a maximum altitude, e.g. $\pm 70\text{m}$, and which as less effective.

Assignment 2

The teacher can deduce from the learners' mathematical computations whether the learners are able to calculate the altitude reached by their rockets. Each learner's line graph and flight

trajectory will differ.

Why people travel into unknown territories

TECHNOLOGY

Grade 7

WORKING WITH WIND AND WATER

Module 6

WATER

Background

Today, different types of machines are used to cause

motion. In the past, people and animals generated the power that was needed to move their vehicles or implements. They had to draw wagons, ploughs and sleds, thus moving the implements by sheer muscle power. Later people learned to harness natural forces such as wind and running water. Nowadays most machines are driven by electricity. A machine has an electrical motor that creates the power for an object to move.

Let us take a look at the source of energy that is to be found in running water. This energy is used in hydro-electric power stations to generate electricity.

INVESTIGATION 1

You will need:

- a pair of scissors
- a knitting needle
- a deep tray
- two drinking straws
- adhesive tape
- string
- water
- a plastic cool drink bottle

Assignment 1:

To make a drawing

[LO 1.3]

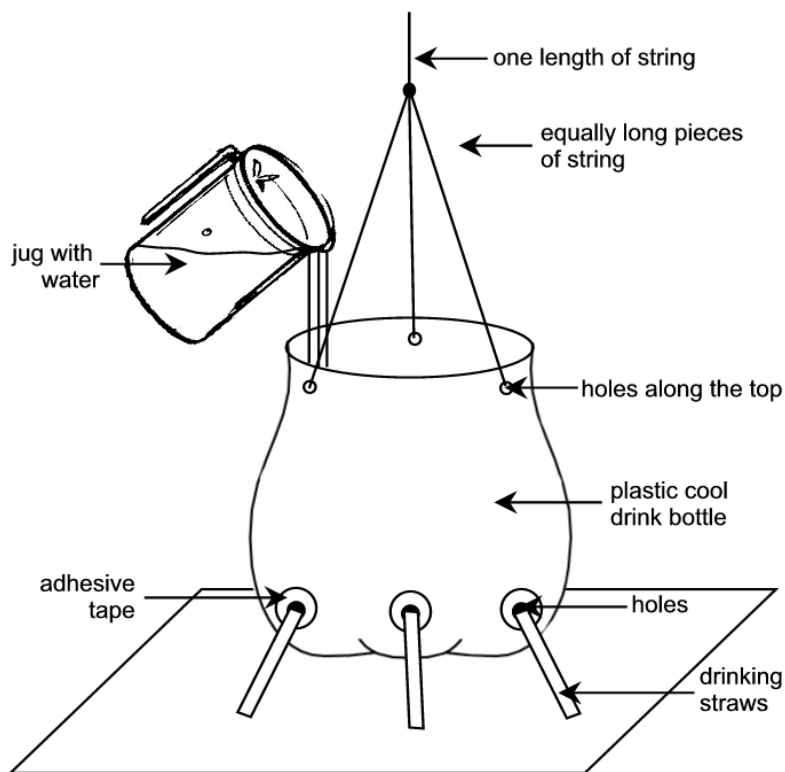
Make a top view drawing with clear labels indicating all the requirements. Use the correct proportion, colour and quantities.

Method:

1. Cut off the top part of the cool drink bottle.
2. Use the knitting needle to make small holes all around the sides along the bottom of the bottle. The holes must be evenly spaced.
3. Cut the straws into 3 cm lengths and stick them through the holes.
4. Use adhesive tape to keep the straws in position.
5. Make three small evenly-spaced holes along the upper part of the bottle.
6. Fasten three equally long lengths of string through the holes and then fasten them to one long piece of string.
7. Fill the bottle with water while holding it over the tray.

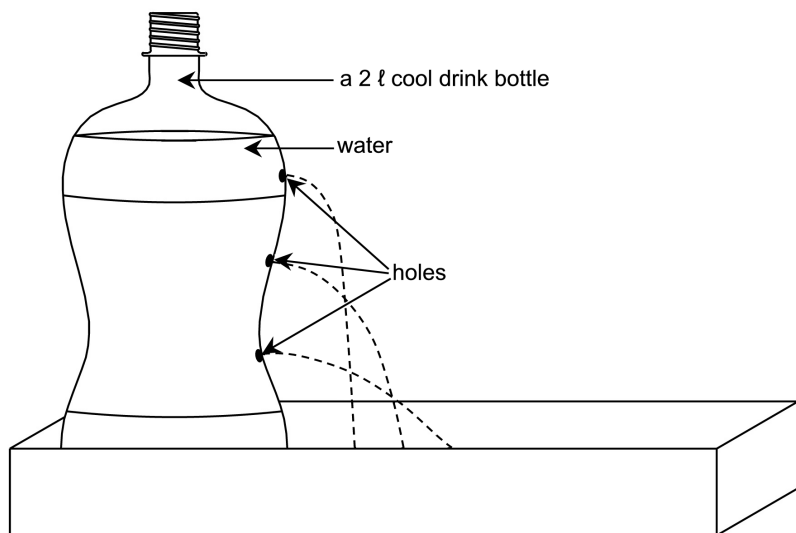
What do you observe?

The water squirts out through the straws and causes the bottle to spin. This kind of device is called a **turbine**.



INVESTIGATION 2

Let us try to discover where the pressure is the greatest in a plastic cool drink bottle that has been filled with water.



You will need:

- a 2 ℓ plastic cool drink bottle
- a pencil
- a deep tray
- a pair of scissors
- adhesive tape
- water

Method:

1. Unscrew and remove the cap of the bottle.
Make three little holes, slightly apart, directly below each other near the bottom of the bottle.
Use a pencil or any other sharp object to make the holes.
2. Cover the holes with adhesive tape.
3. Fill the bottle with water.

4. Now remove the adhesive tape quickly, making sure that all the tape is removed at the same time.

What do you observe?

The water squirts out of the holes. The water that comes from the holes at the bottom of the bottle squirts the furthest.

Assignment 2:

To make a drawing

[LO 1.3]

Make a labelled drawing to demonstrate your observations. Use suitable colours and shading.

Why?

Air exerts pressure on the surface of the water in the

bottle. The top layer of water exerts pressure on the rest of the water below. Therefore the water at the bottom of the bottle is driven out with greater force.

Assessment

Learning outcomes(LOs)

LO1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards(ASs)

We know this when the learner:

investigates:

1.2 examines existing products relevant to a problem, situation or need based on the following key aspects of design.

1.3 investigates by performing simple practical tests relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

Water-wheels

TECHNOLOGY

Grade 7

WORKING WITH WIND AND WATER

Module 7

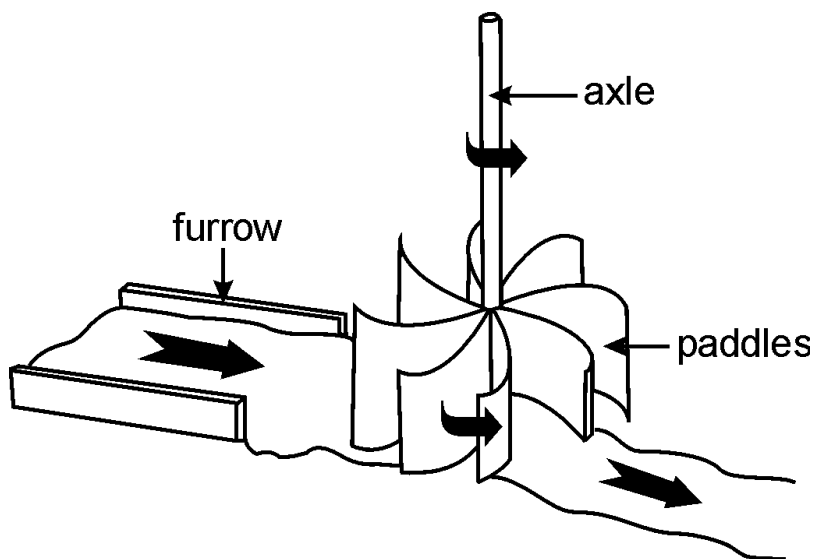
WATER-WHEELS

Background

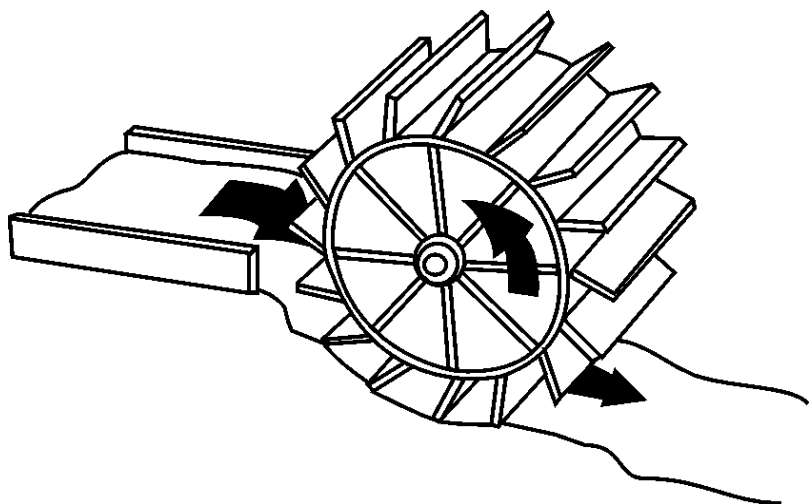
The WATER-WHEEL was one of the first examples

of a motor or a machine that could be operated by making use of running water. A water-wheel is made of a large wooden wheel with blades or paddles that turn on an axle. It utilises the force of running or falling water to make a machine work. The axle of the wheel is connected to the machine, and the power that is generated by the wheel is conveyed to the machine. A water-wheel is therefore an example of a wheel and an axle, because the force of the water on the blades causes a powerful propelling or driving force on the central axle.

The first kind of water-wheel was built in Greece in 200 BC. However, it was not satisfactory, because it turned on a vertical axle and needed fast-flowing water. Because it was small, the wheel generated only enough power for one family to grind their wheat for flour. Marcus Vitruvius Pollio designed a better water wheel in 35 BC.

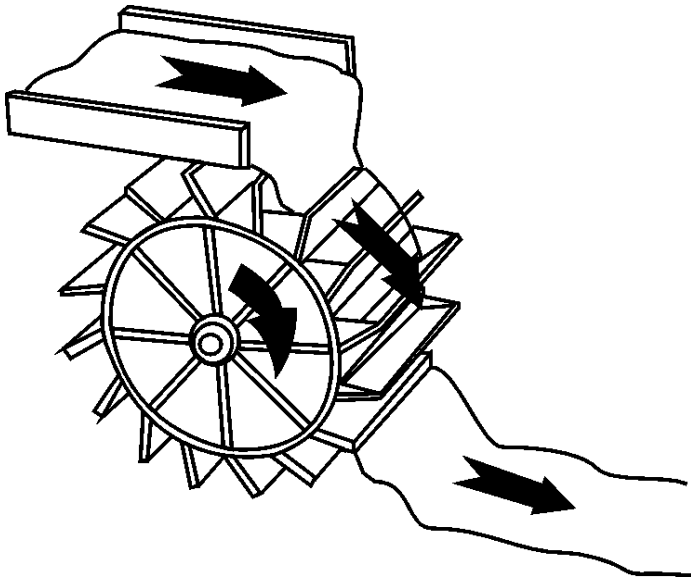


There were mainly three types of water wheels with axles that turned horizontally. They were larger and could generate more power. One type, the **undershot wheel**, was built over running water. It had flat blades and the water ran along the LOWER PART or BASE of the wheel, retaining the same level all the time. The flow of the water against the flat blades at the base of the wheel made the wheel turn.



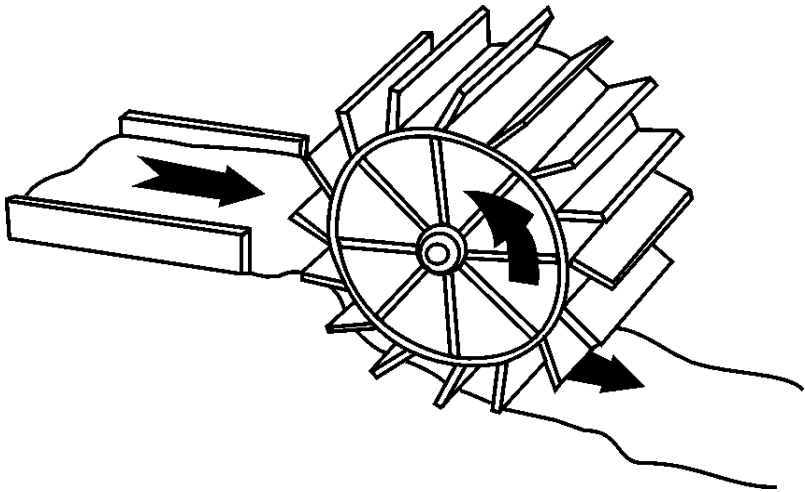
Undershot wheel

Another kind of wheel, the **overshot water-wheel**, had blades that were shaped like little bowls. These “bowls” could catch up the water that was fed to the wheel through a channel or trough. Thus the water cascaded over the blades from a trough **ABOVE** the wheel. The weight of the water in the bowls caused the wheel to turn faster than the undershot wheel that was powered by the weight of flowing water. Therefore, in the case of the overshot water-wheel the water fell on the wheel from above and flowed away on ground level.



Overshot water-wheel

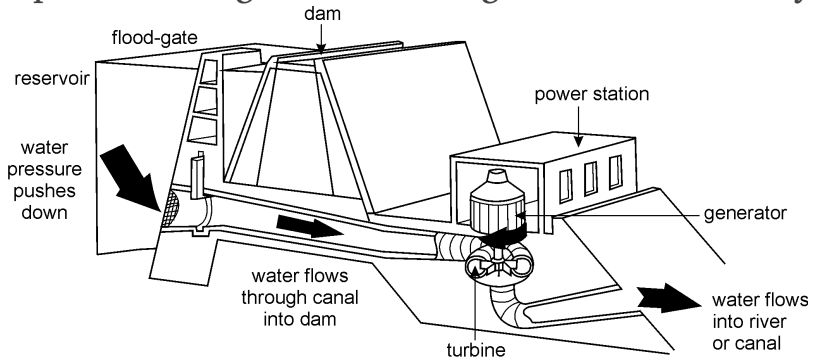
In a **centreshot water-wheel** the water struck the blades in the **CENTRE** of the wheel.



Centreshot water wheel

In a hydroelectric power station the water cascades through a pipe into a dam, and the blades of the turbines are made to rotate. The pressure caused by the cascading water rotates the wheel so that it rotates in the same way as the water wheel. The turbine supplies

the power for a generator that generates electricity.



Making water-wheels

TECHNOLOGY

Grade 7

WORKING WITH WIND AND WATER

Module 8

MAKING A WATER-WHEEL

INVESTIGATION

Problem situation

You are required to lift a certain number of drawing pins over a distance of 60 cm. Your power source is 4 ℓ of water that is supplied 1,5 m above the rotor in a 3 mm plastic pipe.

Design limitations

You may use any one of the following:

For the rotor:

- a cork stopper or
- two cardboard circles, each with a diameter of 20 cm or
- an empty cotton reel

For the axle:

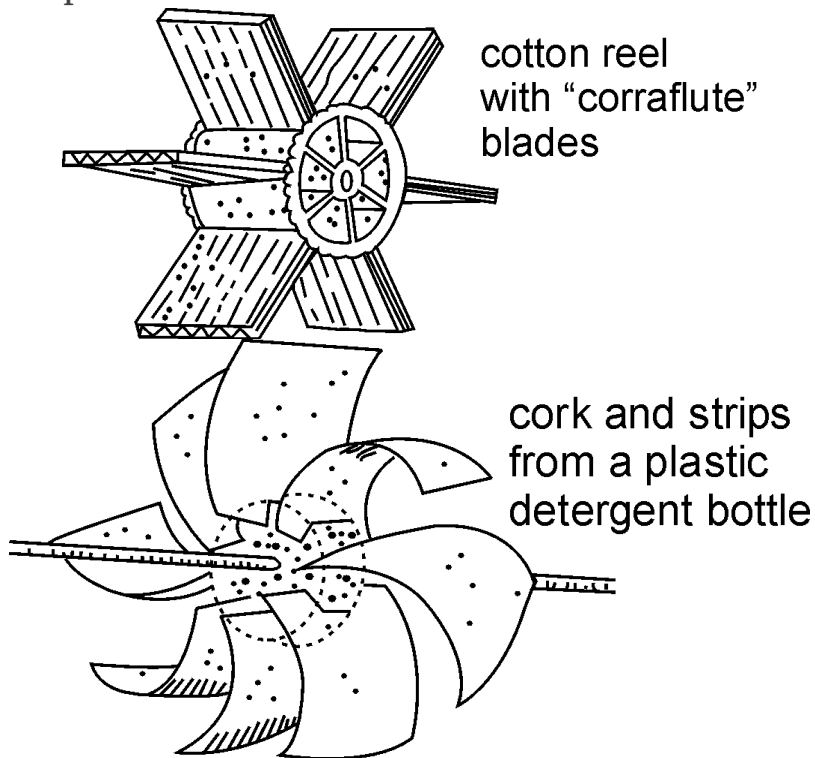
- two toothpicks or
- a knitting needle or
- a 15 cm nail or
- a long rounded pencil or
- a kebab skewer

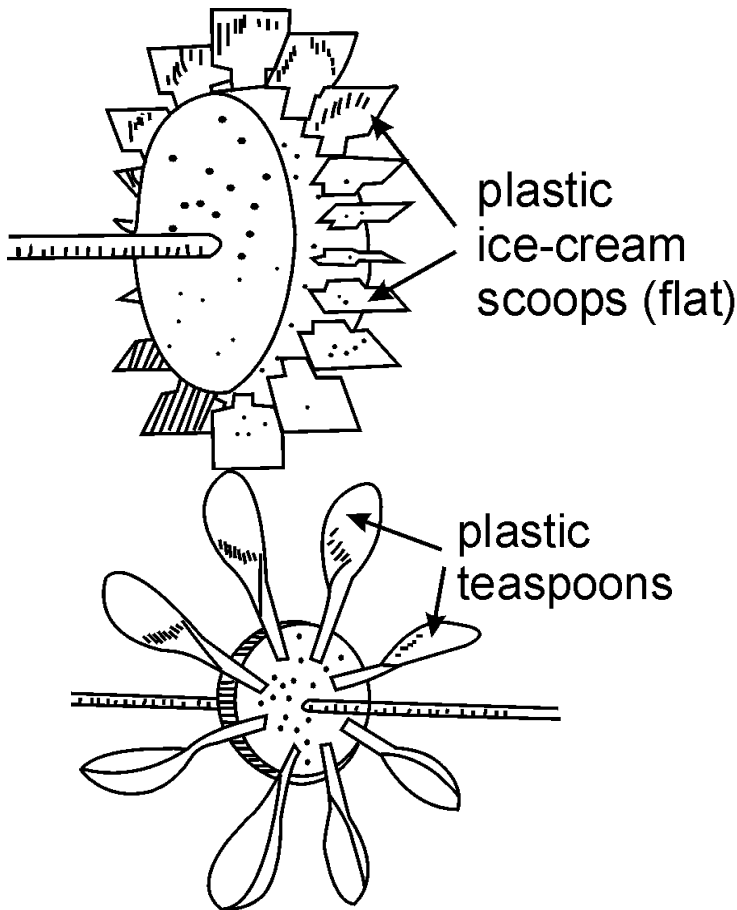
For the blades:

- two egg boxes from which the “cups” have been cut out or
- thick cardboard or
- an empty 2 ℓ plastic cool drink bottle from which the blades can be cut or

- a plastic margarine punnet from which the blades can be cut or
- plastic teaspoons or
- plastic ice-cream scoops (the flat kind)

Examples of water-wheels:





For the stand:

- a ruler with wire that is fastened to the axle at both ends or
- a piece of wood with string that is fastened to the axle or
- an empty 2 l plastic bottle with the bottom cut out or
- a large plastic juice bottle or
- a 2 l plastic milk bottle

To supply the water source:

- a jug that is marked in litres
- a length of plastic tubing (1,5 m long, 3 mm in diameter) fastened to a funnel

To catch up the water: a large, flat plastic bowl

To lift the drawing pins (the hoisting apparatus):

- string or
- wool
- a bowl with a flat bottom for the drawing pins
- an eyelet

You will also need:

- a pair of scissors
- Prestik
- plasticine
- adhesive tape
- a knife
- glue
- waterproof paint and varnish
- a paint brush
- a stapler
- a pencil
- a ruler
- a stylus
- a protractor (for positioning the blades)

Assignment 1:

To analyse a situation

[LO 1.5]

Let us analyse the situation and write a design proposal. (A design proposal is a short statement that could describe a probable solution.)

Complete the following:

I am going to design and make a _____ that will be capable of lifting a

number of _____ over a distance of _____ cm vertically

by using some of the suitable material and tools that have been mentioned.

Design

Assignment 2:

To do research on hoisting apparatus and turbines

[LO 1.4]

Do research on hoisting apparatus (pulleys) and turbines (water-wheels) and draw or paste pictures of existing or antique machines. Briefly explain how they worked. (Find out more about the Egyptian shadoof or the water-wheels of Archimedes.)

Name the reference sources you made use of_____

Memorandum

Assignment 1

- water wheel/crane (hoisting apparatus)
- drawing pins
- 60cm

Designing a water-wheel

TECHNOLOGY

Grade 7

WORKING WITH WIND AND WATER

Module 9

DESIGNING A WATER-WHEEL

Assignment 1:

[LO 1.7]

Seeing that there are certain principles of design that you will have to take into consideration since you may only use certain materials and tools, you will have to write specifications because there are specific details about your design that must be adhered to.

You must contemplate various possible solutions to the problem by drawing all your ideas on paper. Consider various designs. By combining your ideas with the research that you have done, you should be getting closer to a good solution.

Number your ideas and provide labels.

Assignment 2:

[LO 1.3]

Answer the following questions after a thorough investigation in class. It is necessary to investigate all the factors that influence the functioning of the rotor, namely:

- a) How many blades are you going to use?
- b) How far apart will the blades be mounted?
- c) How big (length, breadth) will the blades be?
- d) At what angle will you mount the blades on the rotor?
- e) Which material is the most suitable for the blades?
- f) What is the diameter of the rotor in comparison with the axle?
- g) What lubricant can you use to allow the axle to rotate more effectively in the stand?
- h) How fast or slowly must the water be poured onto the machine through the 3 mm tubes in order to ensure maximum effectiveness?
- i) Where on the machine must the water strike the

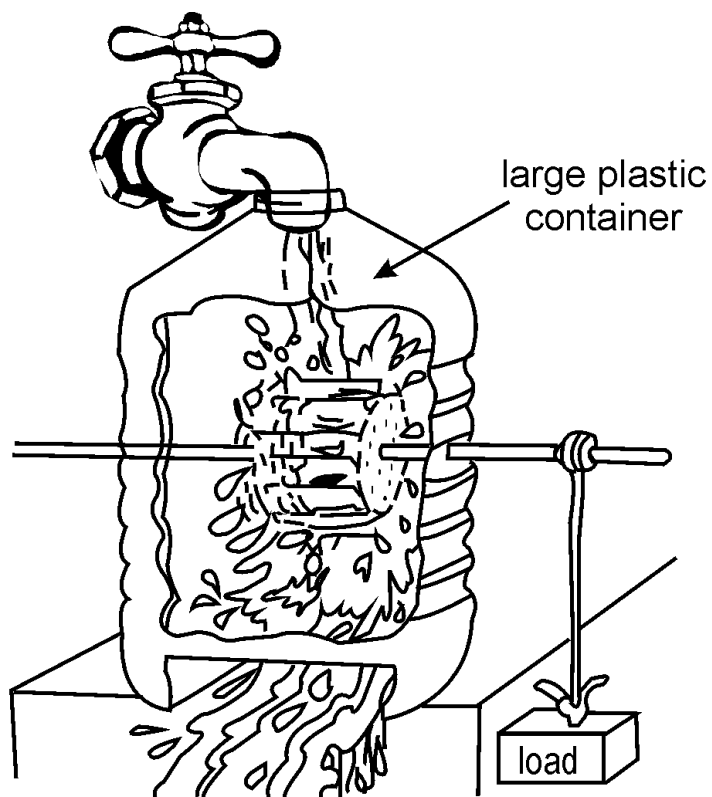
machine in order to ensure maximum functioning?

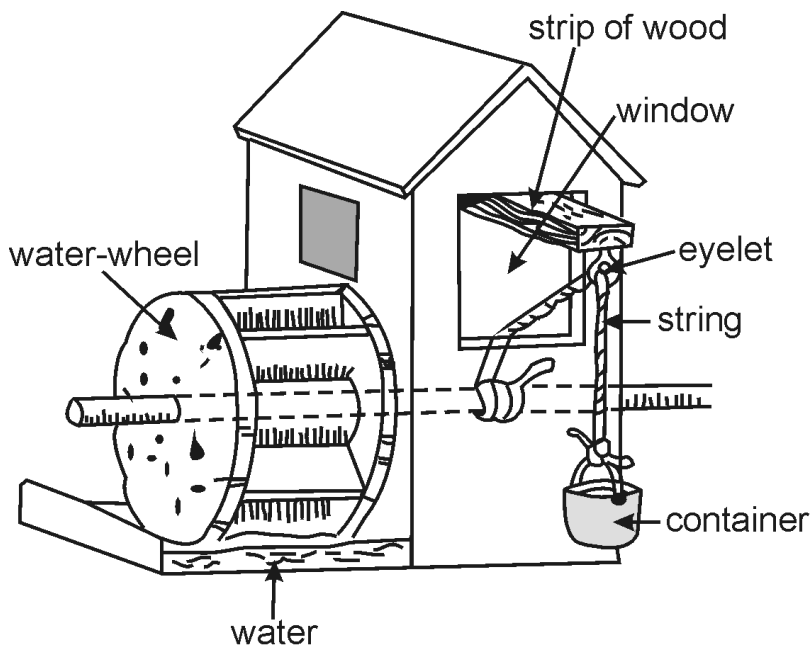
j) How does the size of the machine influence the effectiveness of the challenge?

k) How can you reduce the resistance on the axle or rotor so that the hoisting apparatus will function more effectively?

l) How can you balance the machine so that the drawing pins do not cause the machine to topple over?

m) How can you bring about resistance around the axle in order to make the hoisting apparatus work?





Assignment 3:

[LO 1.8]

At this stage you have to decide which solution needs to be further developed. The chosen solution should be the one that most conforms to the specifications. You now have to develop the final drawing of the chosen design by adding all the information that is necessary for making the design. Thorough planning is important in order to ensure that your work will be completed in time.

Draw exploded views in 3D of your best solution. Use colour and supply the correct measurements.

Assignment 4:

[LO 1.1o]

You are ready to make your product now. This stage is called realisation. In a real-life situation a prototype of the design is built first, and the final product develops from this prototype. Your time is limited, so you have only enough time to build this model which will have to comply with the specifications as closely as possible after it has been tested and adapted.

Before you demonstrate your model to the rest of the class, you must complete the following assignments in writing:

Assignment 5:

[LO 1.10]

Complete the following table to indicate which materials and tools you used:

Part of machine	Material/tools used	Dimensions (if applicable)
The rotor		

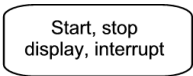
The axle				
The blades				
The stand				
The drawing-pins				

Assignment 6:

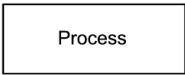
[LO 1.9]

Provide a step-by-step explanation by means of a flow diagram of how you went about making your machine. Measure- Shape - Fasten - Finish. (Hint: Always start a sentence with a verb and use only one verb per step.) Indicate how much time was spent on each step.

Background: Flow diagram



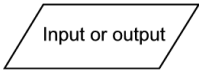
This form is used at the beginning and end of a flow diagram.



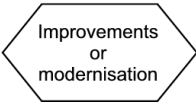
This form is used to describe manufacturing.



This form is used when making a decision. It is followed by a horizontal line underneath, which means that the manufacturer is satisfied with the decision.

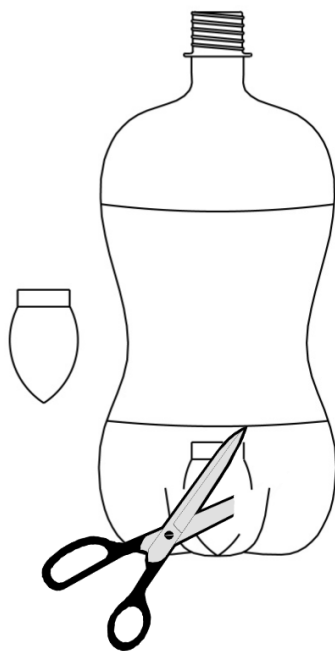


This form is used when another role-player makes an input.

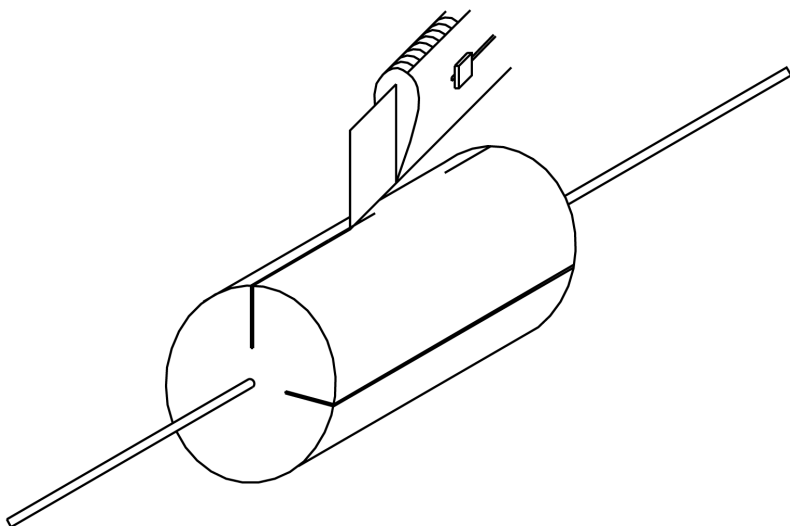


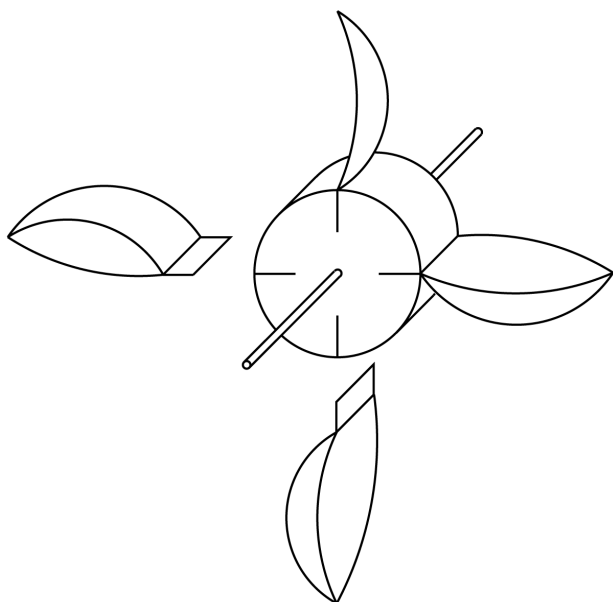
This form is used to make improvements to a product.

Possible solutions

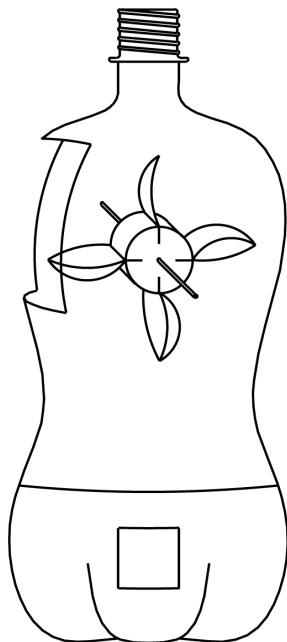


Making the blades

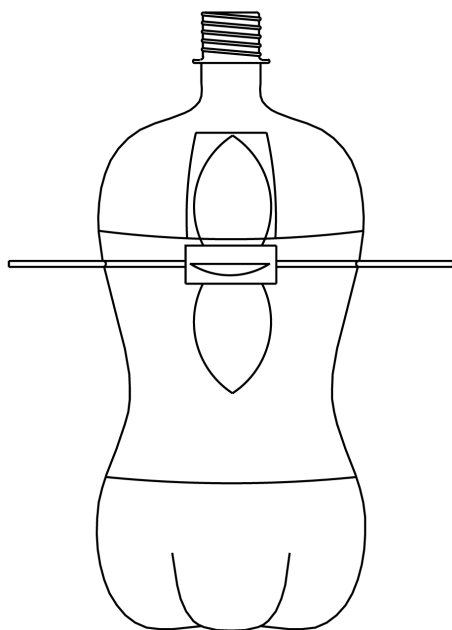




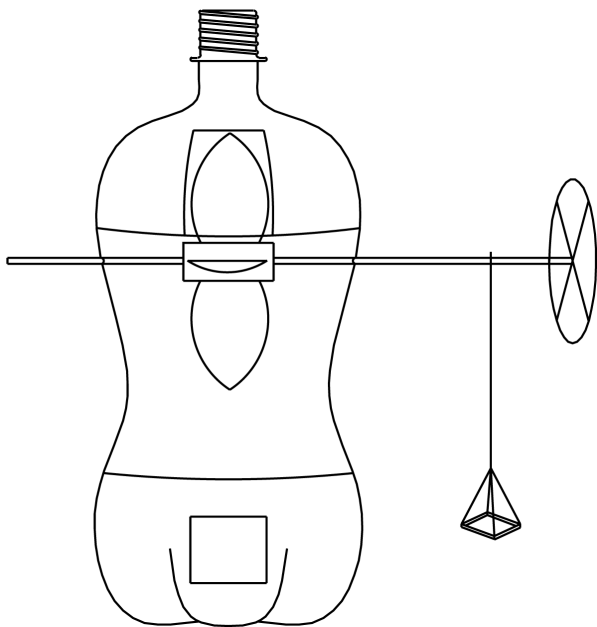
Fixing blades to rotor and mounting on axle



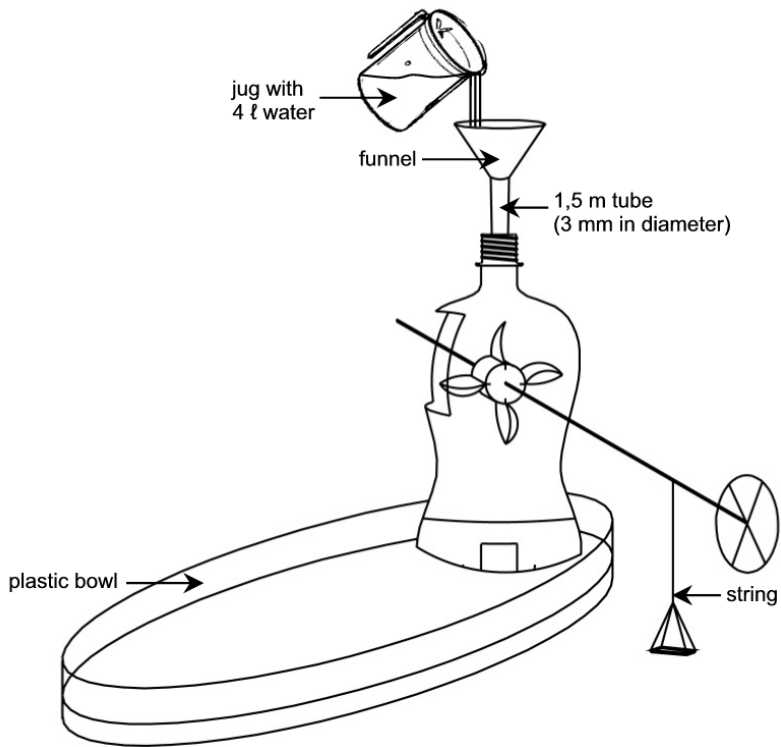
Preparing the stand



Placing water-wheel in stand



Fixing hoisting apparatus (pulley with weight) to axle



Placing water-wheel in stand

Assessment

Learning outcomes(LOs)

LO1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate

information and communication technology.

Assessment standards(ASs)

We know this when the learner:

investigates:

1.2 examines existing products relevant to a problem, situation or need based on the following key aspects of design.

1.3 investigates by performing simple practical tests relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

1.4 during investigations, plans a strategy for collecting data and information.

designs:

1.5 writes or communicates a short and clear statement or a design brief for development of a product or system related to a given problem, need or opportunity;

1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

makes:

1.9 develops a plan for making details.

1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

Memorandum

Assignment 1

The teacher can observe whether the learners' designs are practicable.

Assignment 2

Learners must discover through their own practical experimentation which type of apparatus appliance works best for them. Various answers are acceptable, as long as the answers are appropriate and develop meaningfully.

Assignment 3

Learners' drawings must be consistent with their final model.

Assignment 4

Learners can now be given sufficient time (± 2 hours) to compile their models.

Assignment 5 and 6

These two assignments can be completed while the learners make the models or after they have finished them.

Assignment 10

The basic steps that should have been followed in making the model are explained here. The teacher can use them as a guideline in assessing steps 8 and 9. Learners must be encouraged to respond honestly when they complete the questionnaire.

What is electricity?

TECHNOLOGY

Grade 7

ELECTRICITY

Module 10

WHAT IS ELECTRICITY?

Background

Electricity is a type of energy. An object has

electrical energy when it has the ability to conduct electricity. Electricity is measured in Volts.

Electrical energy can be easily converted to other forms of electricity.

There are two main types of electricity:

- main stream electricity
- battery electricity

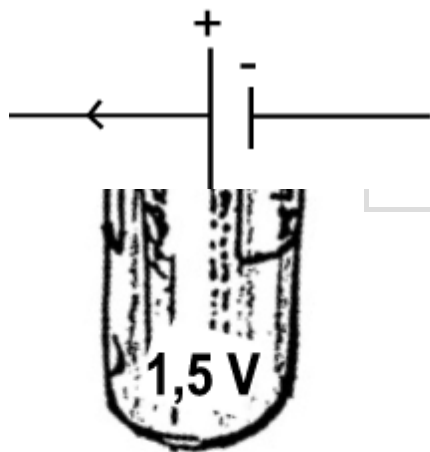
Battery-electricity

Electrical energy are stored in batteries. The energy in batteries are called chemical energy. When electrical energy moves, the electrons flows in an electrical circuit.


The basic elements of an electrical circuit is:

a **source of energy** e.g. a battery

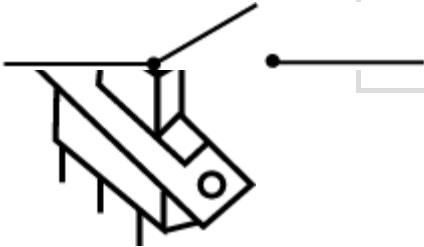
Sketch	Symbol



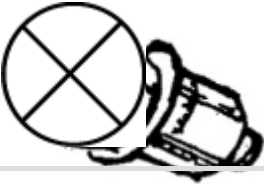
a **conductor** e.g. a sort of metal in the shape of a wire

Sketch	Symbol
 <p data-bbox="139 1321 301 1377">insulator</p>	

a **switch** to form an open or closed circuit

Sketch	Symbol
	

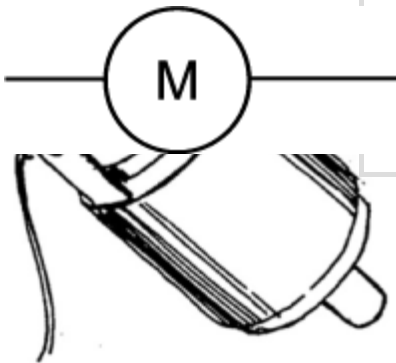
a **load** e.g. a source of light, sound, motion or heat

Sketch	Symbol
a light	
	

a buzzer



an electrical motor



Two or more of the same component in an electric circuit can be connected in two different ways in the circuit;

- in **series** where a positive pole of one cell is linked to the negative pole of another cell;
- in **parallel** where all the positive poles of the cells are connected with one another and all the negative poles are also connected like this.

Advantage of cells in series – current supply becomes more powerful

Advantage of cells in parallel – the cells can produce the same current for longer.

To the teacher:

These worksheets should be done in groups. Each group can construct a different circuit and then explain it to the rest of the class before completing a worksheet. A class should be divided into 7 groups, because there are 7 worksheets. This would save a huge amount of time. Each group should construct a test circuit with a switch, 1,5 V lamp, lamp holder and a 1,5 V cell in a cell holder. First screw the holders and switch on the board, add the wire between them and then add the cell and lightbulb.

Equipment and tools needed:

- 1,5 V batteries
- 1.5 V light bulbs
- light bulb holders
- wire/flex
- 7 strip connectors
- battery holders
- 7 switches
- small screws
- flat nose and star screwdrivers
- 7 pieces of insulation board 150 mm by 150 mm
- connectors
- buzzers with a low voltage
- diodes and resistors

Assignment 1:

To investigate by means of a simple practical test [LO 1.3]

To extract relevant data [LO 1.4.4]

To evaluate the system [LO 1.12]

To show knowledge and understanding of electric circuits [LO 2.2]

WORKSHEET 1:

- Connect one 1,5 V cell in a battery holder to a 1,5 V lamp in a lamp holder with wire and a switch on a piece of insulation board.

- Make a simple drawing of the circuit.

1.3 Draw a circuit diagram of the circuit, using the correct symbols.

1.4 Underline:

The light bulb shines (very brightly/bright/dimly/not at all).

WORKSHEET 2:

2.1 Connect one 1,5 V cell in a cell holder to two 1,5 V lamps in two lamp holders in parallel using wire and adding a switch on a piece of insulation board.

- Draw a circuit diagram of the circuit.
- Unscrew one of the lamps from its holder. What happens to the other lamp? Explain why this happens.
- Underline:

The light bulbs shine (very brightly/ brightly/ dimly/ not at all).

WORKSHEET 3:

3.1 Connect one 1,5 V cell in a cell holder to two 1,5 V lamps in lamp holders fitted in series with wire and a switch to an insulation board.

3.2 Draw a circuit diagram of the circuit.

- Unscrew one of the lamps from its holder. What happens to the other lamp? Explain why this happens.

3.4 Underline:

The light bulb shines (very brightly/ brightly/ dimly/ not at all).

WORKSHEET 4:

4.1 Connect two 1,5 V cells in parallel to two 1,5 V lamps connected in parallel.

4.2 Draw a circuit diagram of the circuit.

- Underline:

The bulbs shine (very brightly/ brightly/ dimly/ not at all).

4.4 Underline:

The influence of the two cells connected in parallel on the magnitude of electric current are (**big/ small**).

WORKSHEET 5:

5.1 Connect two 1,5 V cells in series to two 1,5 V

lamps connected in parallel.

5.2 Draw a circuit diagram of the circuit.

5.3 Underline:

The light bulbs shine (very brightly/ brightly/ dimly/ not at all).

5.4 Underline:

The influence of the two cells connected in series on the magnitude of the electric current are (big/ small).

WORKSHEET 6:

6.1 Connect two 1,5 V cells in series to a buzzer and one 1,5 V lamp in series.

6.2 Draw a circuit diagram of the circuit.

6.3 Does it work? Why or why not? Give an explanation for your answer.

WORKSHEET 7:

7.1 Connect two 1,5 V cells in series with a buzzer and one 1,5 V bulb in parallel.

7.2 Draw a circuit diagram of the circuit.

7.3 Does it work? Why or why not? Give an explanation for your answer.

WORKSHEET 8:

- What does it mean if two lamps are connected in parallel?
- What does it mean if two lamps are connected in series?
- What are the advantages of connecting lamps in parallel?
- What are the advantages of connecting cells or batteries in parallel?
- What are the advantages of connecting cells or batteries in series?

- What is the function of a resistor in a circuit?
- **Underline:** A resistor in a circuit is connected in (series/ parallel) with a lamp or buzzer.

- What is the function of a diode in a circuit?
- Underline:

A Diode is connected in (series/ parallel) with the loads in a circuit.

Assessment

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Learning Outcomes(LOs)

LO 1

TECHNOLOGICAL PROCESSES AND SKILLSThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

Assessment Standards(ASs)

We know this when the learner:

investigates:

1.1 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

1.2 examines existing products relevant to a problem, situation or need.

1.3 investigates by performing simple practical tests relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

1.4 during investigations, plans a strategy for collecting data and information.

evaluates:

1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

LO 2

TECHNOLOGICAL KNOWLEDGE AND

UNDERSTANDING The learner will be able to understand and apply relevant technological

knowledge ethically and responsibly.

Assessment Standards(ASs)

We know this when the learner:

processing:2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

Electrical safety

TECHNOLOGY

Grade 7

ELECTRICITY

Module 11

ELECTRICAL SAFETY

Use safe working practices and show awareness of efficient ways of using materials and tools.

Safety procedures are a most important aspect of being in any workshop and you should make sure that you know and practise them from the start. Make sure that you know where to find the emergency button and the first aid box. Remember to report all accidents, no matter how small, to your teacher.

- Always wear an apron or overcoat to protect your clothes and sensible footwear to protect your feet.
- Take off your blazer or jersey, roll up your sleeves and tuck your tie out of the way.
- Long hair should be tied back.
- Any jewellery you may be wearing should be removed.
- Never fool around with any tools.
- Never run or play in a workshop, especially with a sharp tool in your hand.
- You are allowed to talk quietly, but you should not shout.
- You must never work alone or without permission in any workshop or practical area.
- Read all instructions for using tools carefully and make sure that you follow them.
- Take great care when carrying tools or materials. Carry sharp tools close to your body and facing downwards.
- Never misuse tools of any sort.
- Replace tools after use.
- Be sure to keep your bench and floor area tidy.

- Never use a machine without permission or the correct training.
- Never use electric tools in damp or wet conditions.
- There must never be more than one person operating or near a machine at any time.
- Clean machines after you have used them, and report any problems or damage to your teacher. Blunt or damaged items should be changed.
- When you have finished work, wash and dry your hands properly.
- Be especially thorough if you have been using oil, chemicals, paints or resins.
- Never hold the wood in your hand while you saw it with the other hand.
- Never screw into a piece of wood held in your hand.
- Never chisel towards your hand or body.
- Use a bench hook for cutting spars or dowels.
- Always keep your tools tidy and out of other people's way.



ELECTRICAL SAFETY

Much of the equipment used in class requires electrical power from either batteries or the mains. Remember that moisture and water conduct electricity. Care should be taken when handling electronic components, such as capacitors. Batteries are best kept in separate containers when not in use. Return them at the end of the lesson. Do not put projects away with batteries in place or connected. Do not be tempted to tinker with mains electricity. If you come into contact with a live wire an electric shock or fatal accident could be the result. Electric shocks can cause severe burns and other injuries, so always take care.

Plugging IN

- Check that the appliance is switched off.
- Check that the socket is switched off.
- Make sure that the lead and plug are not damaged.
- Plug in.
- Switch on the socket.
- Switch on the appliance.

Switching OFF

- Switch off the appliance.

- Switch off the socket.
- Remove the plug from the socket.

You must not use an electrical appliance without either a teacher in the room or at least two other pupils in the room and a teacher close at hand. If you are present when a person receives an electric shock you must carry out the following procedure

- Do not touch the person.
- Send for adult help.
- Press the stop button to cut off the mains power.
- Switch off the appliance at the socket and pull out the plug.
- If this is not possible, try to push them away from the electricity. Use something made of wood which does not conduct the electricity to you.
- If you are certain that the power is off, then you can attempt to give the person first aid if you have been trained to do it.
- If you give yourself a slight electric shock you may feel weak, so relax a bit before carrying on working.

N.B.: Take good care of a person who has been injured. Keep him / her warm, let him / her lie down and call for help.

SAFETY MEASURES with regard to

SCISSORS

- A scissors must be good quality, sharp and in good working order.
- Never let the tips of the scissors close when cutting a line greater than the length of the blades.
- When cutting curves always turn the card and not the scissors.

CRAFT KNIVES

- Only to be used under very close supervision together with a metal safety ruler.
- Cut onto a suitable safety surface e.g. Very thick card/ cutting board.
- Stand when you cut and retract the blade when you need to put it away.
- The blade should not be too far out.
- You are allowed with the knife in your hand only when you are going to cut.

DRILLS

- You should know how to change twist drills, how to hold the hand drill and how to keep it at right angles to their work.
- The material to be drilled must be cramped securely.
- Do not remove the chuck completely as it is very difficult to reassemble.
- Select the appropriate twist drill – choosing one too small rather than one too big if in doubt.
- When drilling turn the handle in a clockwise direction and continue turning the same way when removing the drill bit from the hole.
- Hand drills are for holes up to 6mm in diameter; use a brace and bit for larger holes.
- Never leave a hand drill lying on a work top as it can so easily fall off and damage the twist drill.

GLUE GUNS

- Must only be used under very close supervision.

- It is suitable for wood, metals and certain plastics.
- When it is switched on and not in use ensure that it is correctly positioned on its stand.
- Switch off after use.
- Be careful of glue that drips and put it away after the gun is cooled off.

GENERAL

- When sawing plastics and metals , safety spectacles should be worn, because there is a risk of eye damage.
- Some plastics become pliable when heated but care must be taken to control the temperature because the burning of plastics is dangerous as many give off poisonous fumes.
- Polystyrene should be cut with a hot wire cutter set low and used in a well ventilated room.

SOLDERING IRONS

- Soldering irons must be treated with respect. They often use mains electricity and get very hot.

The rules for correct use are as follows:

1. Do not leave them switched on for possible future use. Always switch them off when not in use, because this will prolong the life of the iron.
2. Never touch the mains lead with the tip of the iron. It will melt and expose bare wires which could lead to an electric shock.
3. Always use a proper soldering iron stand. Failure to do so will mean that there is a risk of the hot iron setting fire to things.
4. Avoid breathing in the resin fumes from the flux.
5. Protect the work surface with hardboard.

First aid for other injuries

SMALL CUTS

- Wash the cut in cold water to clean it and stop the bleeding. Dry well with a clean cloth and cover it with sticky plaster to keep it clean.

SERIOUS CUTS

- Press the wound hard with a clean handkerchief, tissue or your hands to reduce the bleeding.
- Put the wound higher than the rest of your body to lessen the flow of blood.
- Find or call someone to help you.

SPLINTERS

- Sterilize tweezers or a needle in the blue part of a flame.
- Make sure you get all the splinter out.
- Then clean the wound with antiseptic liquid and cover it with sticky plaster.

BRUISES

- Wash with cold water to reduce bruising and swelling.
- A bruised fingernail may go black. If very painful, see a doctor.
- Blood blisters should be left to dry up, not popped.

ASSIGNMENT 1:

To draw up a list of safety measures

[LO 1.6]

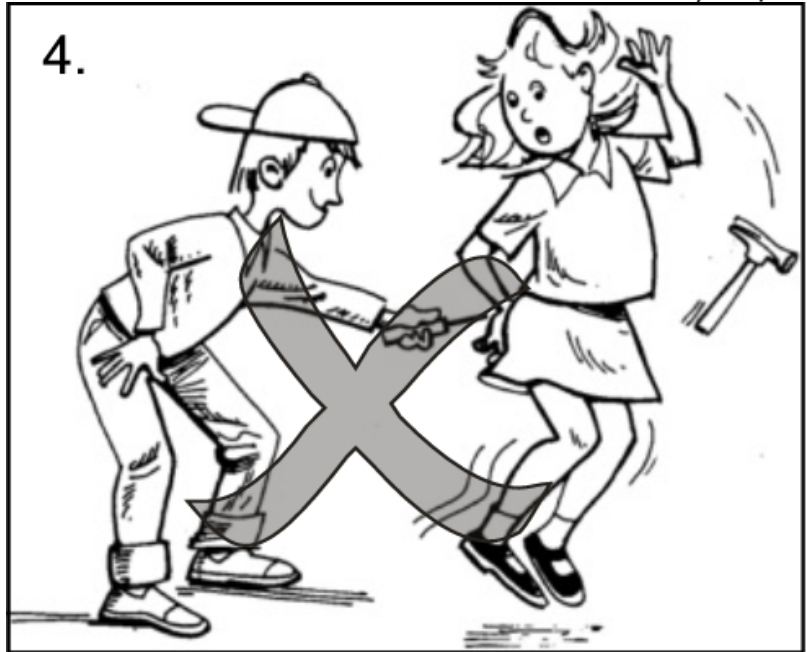
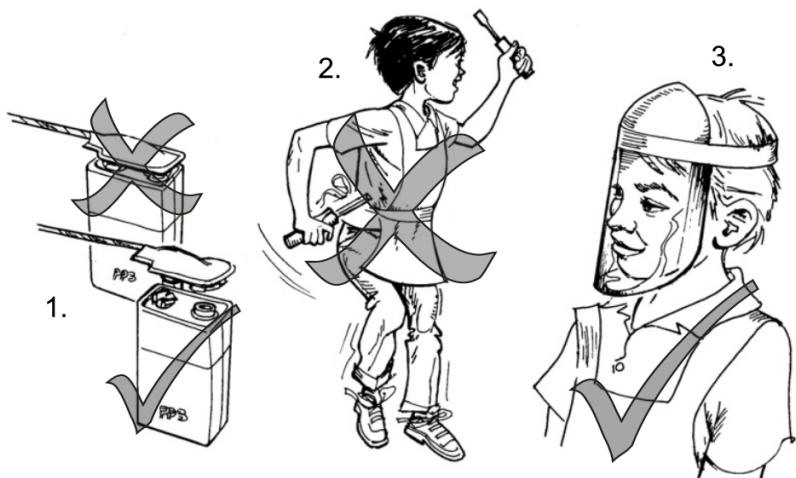
Write down five rules that you must obey with regard to wearing the correct clothing in the Technology class.

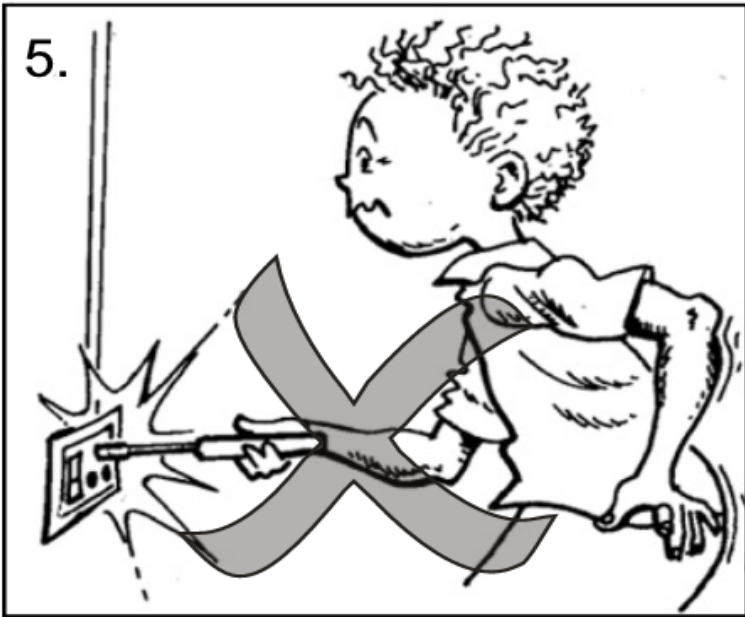
ASSIGNMENT 2:

To emphasise safe working practices

[LO 1.11]

Explain the rule that applies to each of the following sketches:





ASSIGNMENT 3:

**To write a short and clear statement
about the safe handling of tools**

[LO 1.5]

Produce a short rule with a fitting lettering design for any tool that you use in the Technology class, for example soldering irons, utility knives, glueguns, drills, saws, ex. The emphasis in the lettering type, should be that it should be easily readable, a warning and informational. The rule/s must focus on a safety aspect.

Bright colours, a bold lettering style and asymmetrical lettering would be regarded as suitable. The best examples will be laminated and put up in the class. You must use a computer or stencils for your final product.

Assessment

Learning Outcomes(LOs)

LO 1

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1.3 investigates by performing simple practical tests relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

1.4 during investigations, plans a strategy for collecting data and information.

design:

1.5 writes or communicates a short and clear statement or a design brief for the development of a product or system related to a given problem, need or opportunity;

1.6 lists product and design specifications and constraints for a solution to a given problem, need or opportunity.

1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

make:

1.9 develops a plan.

1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or

combining, and finishing different materials with some accuracy;

evaluates:

1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans.

An electronic maths game Part 1: the design

TECHNOLOGY

Grade 7

ELECTRICITY

Module 12

AN ELECTRONIC MATHS GAME

Part 1: The design

ASSIGNMENT 1:

To make an electronic mathematics game

[LO 1.2, 1.7, 1.12, 1.13]

Systems and Control

Problem:

The learners in Gr.4 at _____ Primary School experience problems in learning their tables in Mathematics.

Design brief:

Design or make a solution for this problem.

Market research

Ask each of the following questions to at least ten Grade 4's.

A.

Names of learners who participated in the survey	Gr.4	Do you	Yes	Know your?	Tables?	No
	1.					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

B.

--	--	--	--	--	--	--

you best? Make a tick in the appropriate column indicated by the learner's number

Parents

or
relatives
ask

~~tables~~

Write

a
tables
test

in
class
every
day

Regularly

play
tables
games

(non-electronic, e.g. cards)										
Errors are written out										
Regularly play electronic computer games										
Other										

D. Write down a few reasons why a solution to this problem will have a positive effect on the lives of Grade 4 learners.

Possible solutions to the problem.

- Parents or older relatives should do better consolidation at home.
- Learners should write a tables test daily.
- Design games to ensure consolidation in a playful manner.
- Learners write out mistakes made in tests 50 times.
- Other:

Design specifications and limitations

People (age/market):_____

Purpose: _____

Appearance: Colour:

Form:

Function:

Impact on environment – made where?

- used where?

Safety measures during making:

During use:

Design proposal

I am going to design and make a _____ (what)
for _____

(whom) so that they will know their _____ better
(objective) and apply the knowledge in
_____where).

Cost of material used for electric circuit:

Isolation board

Bulb

Bulb socket

Battery (9V)

Battery connector

Screws

Resistor

Buzzer

Connectors

Isolation wire

Washers

Split pins

Cost of material used for container:

Cardboard

Isolation wire

Split pins

Cost of manufacturing

Selling price

Profit

Time allocation for design and making of game

Date _____

Problem
and
market
research
INVESTIGATION:
Limitations,
specifications
and
design
proposal
DESIGN:
Initial
ideas
Design
MAKING:
Selection
of
materials
and
tools
Making
of

component
Description
of

process

EVALUATION:

Sketch

of

product

Evaluation

of

product

Composition

of

project

portfolio

Investigate at least 3 different electronic games and complete each column of at least 5 different factors of design.

			Game1	Game2	Game3
Nr.	Name of game				
1	Sketch of appearance				
	ShapeColour				

2	Size							
3	Control							
4	Cost and is it affordable for all the groups in the community?							
5	Durability							
6	Amount of games							
7	Purpose							
8	Materials used and do they benefit or are they to a disadvantage to the environment.							

9	For what age group and what influence							
---	--	--	--	--	--	--	--	--

does it
have on
them?

10

Power
source

SOURCES:

Game 1:

Game 2:

Game 3:

Assessment rubric

Investigation

4 Gather
relevant
information
accurately
and
thoroughly

3 Gather
sufficient
information

2 Gather
limited
information

1 Gather
little
information

Teacher: _____ Date: _____

Comment: _____

Parent or Guardian: _____

Comment: _____

Assessment

Learning Outcomes(LOs)

LO 1

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Assessment Standards(ASs)

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relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

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1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

evaluates:

1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action

followed and suggests improving future plans.

An electronic maths game Part 2: Mathematics game

TECHNOLOGY

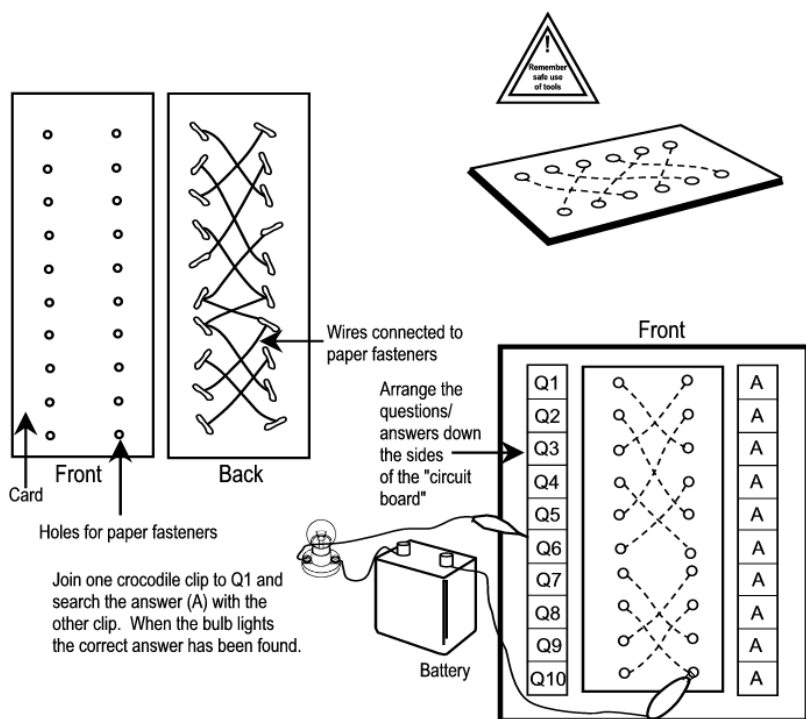
Grade 7

ELECTRICITY

Module 13

AN ELECTRONIC MATHS GAME

Part 2: Mathematics game



Needs:

- name
- screen with positions for buzzer and light
- 10 questions and 10 answers
- 20 split pins

Design: Final working drawing

Suggestion for the teacher: Learners can approach the project in groups of three. One learner designs and makes the front view (lid), one learner designs

and makes the electric circuit of the game, and the third learner designs and makes the container in which the electric circuit is placed.

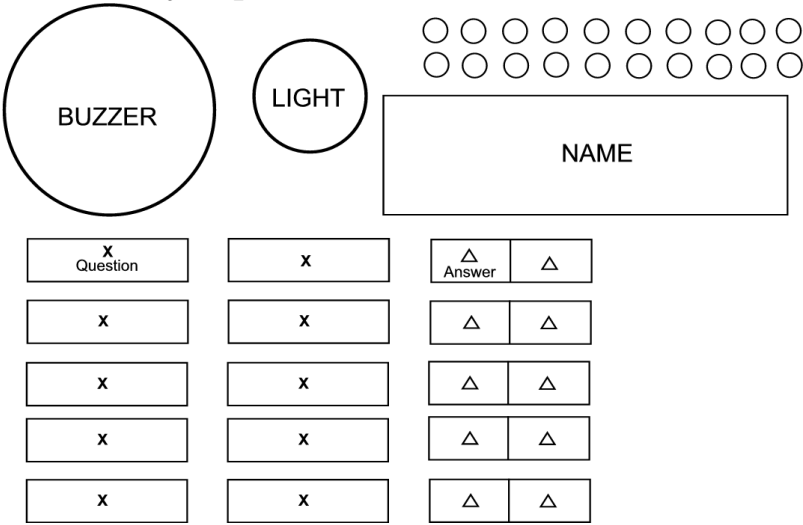
Learner 1:

Sketch the front view (2D-drawing) of the electronic game.

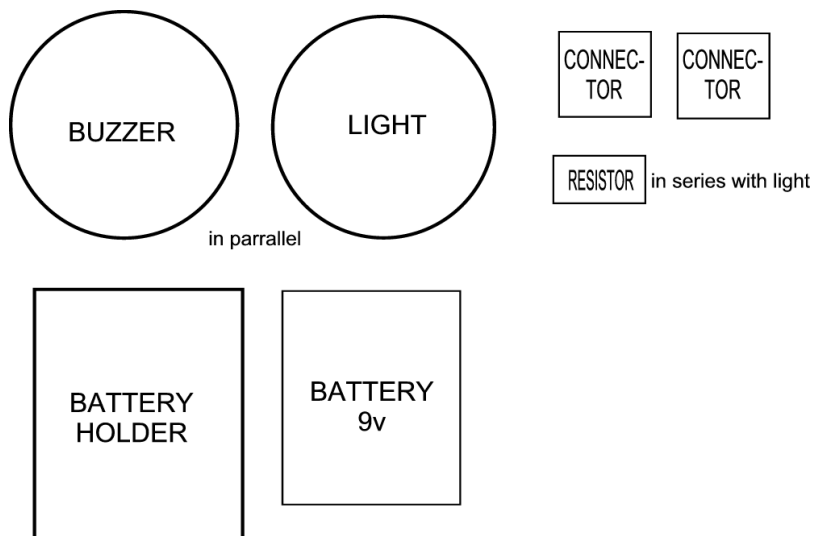
(Use sketches of parts, cut out and paste).

Learner 2:

Sketch the layout of the electric circuit. Also apply the necessary captions/comments.



Sketch a circuit diagram. Use the correct symbols and supply a key to explain each symbol.



Assessment of design for electric circuit

	Yes	No
1. Resistor is in serie with light.		
2. Two wires run from buzzer directly to connector/s.		
3. Two wires run from light bulb directly to connectors.		

4. A wire from the buzzer and light each go through one hole of the connector.

5. The other two wires from the buzzer and light go through one opening of the connector.

6. One wire from the connector goes to the battery and then to the front.

7. The other piece of wire goes directly to the outside.

8. Both of the outside wires have poles fitted to it.

9. Length and width of insulation board are given.

10. Five other dimensions are shown.

11. Red wire runs from battery to buzzer and light.

12. Black wire runs from buzzer and light to battery.

13. Key is complete and correct.

14. Circuit diagram is complete and correct.

Learner 3:

Design:

Sketch and planning of container for electric circuit in isometric. Indicate the tessellation pattern and use an isometric grid.

Design the net of the container/box on A3 graph paper.

Assessment

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Learning Outcomes(LOs)

LO 1

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1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans.

An electronic maths game Part 3: making the game

TECHNOLOGY

Grade 7

ELECTRICITY

Module 14

AN ELECTRONIC MATHS GAME:

Part 3: Making the game

Making

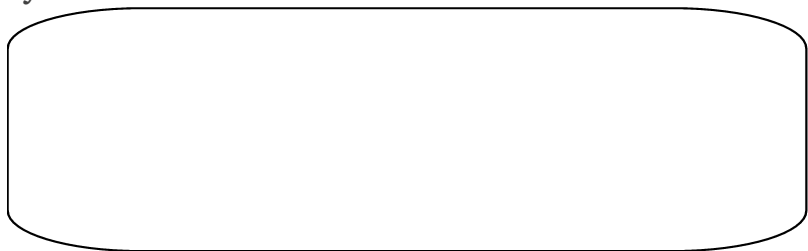
Steps for making the product _____ through a simple process flow chart.

The functions of a process flow chart are:

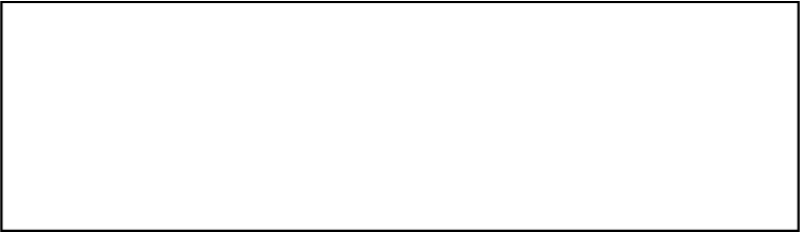
- to separate actions in a process;
- to arrange the different actions in a logical order.

Every type of activity is described by a frame or block with a specific shape.

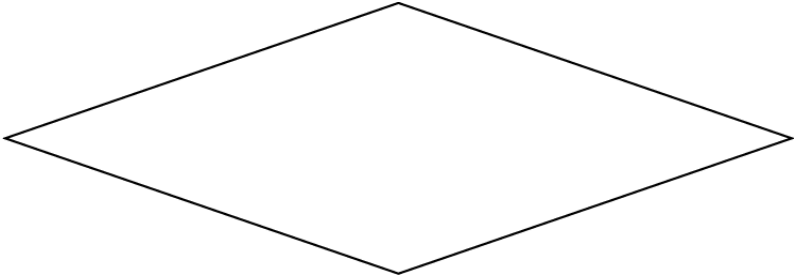
Write the different stages by making sentences with each action, material and tool that you've used. Use only one action in a frame.



Start/End block

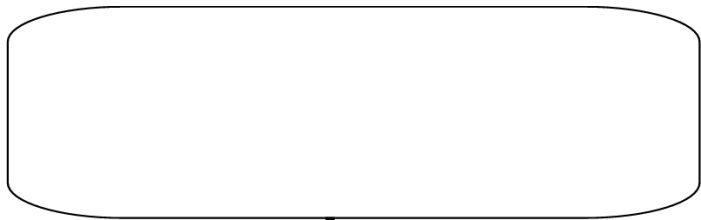


Process block



Decision block (yes/no)

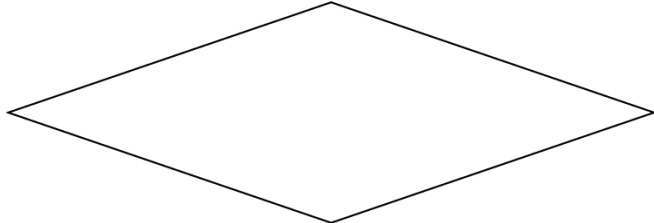
1.



2.



3.

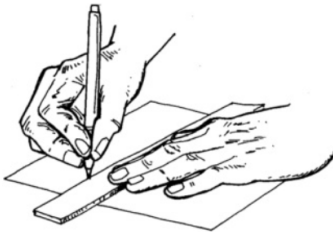


Learner 3: Instructions for making the container

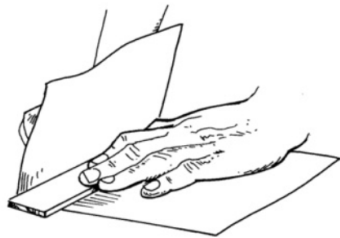
1. Place the template (on graph paper) , the carbon copy-paper and the A4-cardboard on top of each other in the same order. Staple them together with a stapler so that the pages do not shift when you start copying.
2. Answer the following questions about your container:
 - How many sides does it have?

- How many pairs does it have of equal size?
- How many edges does it have?
- How many corners does it have?
- How many flaps does it have?
- How many pairs of flaps of equal size does it have?
- Using a HB-pencil and a ruler, copy the 2D-form on the cardboard. First draw the straight lines and then the dotted lines. Check if all of them have been drawn.
- Remove the staples and cut out the 2 D-shape along the uninterrupted lines.
- Notch the dotted lines on the side with the carbon copy markings, using scissors and a ruler. Work on a suitable surface; practise first so that you do not make the notches too deep.

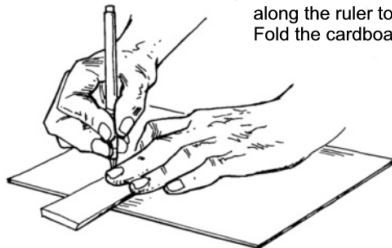
1. Draw with a scissors or ballpoint pen along a ruler to notch the paper.



2. Fold the paper along the line you have notched.



3. Draw with a scissors or ballpoint pen along the ruler to notch the cardboard. Fold the cardboard along the notch.



Notch and fold the cardboard.

1. Fold on the dotted lines, using a ruler.
2. Apply the tessellation design with a pencil and your favourite template on the back and sides of the right side of your container. Colour the pattern in and draw the lines with a black pen/ fine-liner.
3. Complete the lid of the container (name, soldering, light source, questions) according to your final design.
4. Apply wood glue to the flaps and model the 3D-container. Hold firmly in position so that the container can dry properly. (Do not use too much wood glue. The surface must just be slightly sticky.)

Put the electric circuit in the container. Make two holes in one side where the connections should come through.

Designing and making a warning system

TECHNOLOGY

Grade 7

ELECTRICITY

Module 15

DESIGNING AND MAKING A WARNING SYSTEM

Assignment 1:

To design and make a warning system

[LO 1.1, 1.2, 1.5 to 1.13]

Design and make a warning system with two output devices (light and buzzer) that can be installed at the door and inside the room. This system should be able to tell the occupants of the room when somebody else wants to enter at the door by giving off a light and sound signal in the classroom.

Situation

The door of the Technology class is connected to the classroom by means of a long passage. It is sometimes impossible for the occupants of the room to hear when somebody is knocking at the door. Therefore is it necessary for someone to shout or hammer on the door. The teacher prefers that the

door should be kept closed because pupils sometimes tamper with other learners' products or with tools that are stored in the passage.

- Investigation:

Analyse and write the problem down in your own words.

Research:

Make a list of existing products and solutions. Paste pictures of their appearance and cost.

Modelling:

Investigate different types of switches and make models of types that would suit to resolve the problem.

Design:

Design brief (Who? What? Where? When? Be able to?)

Specifications and constraints:

- Who is it for (age, access)?
- What is its purpose?
- What will it look like?

- What influence will it have on the environment?
- What will the cost of the materials used be?
- Distance between input and output?

Initial designs / solutions:

Choice with reasons:

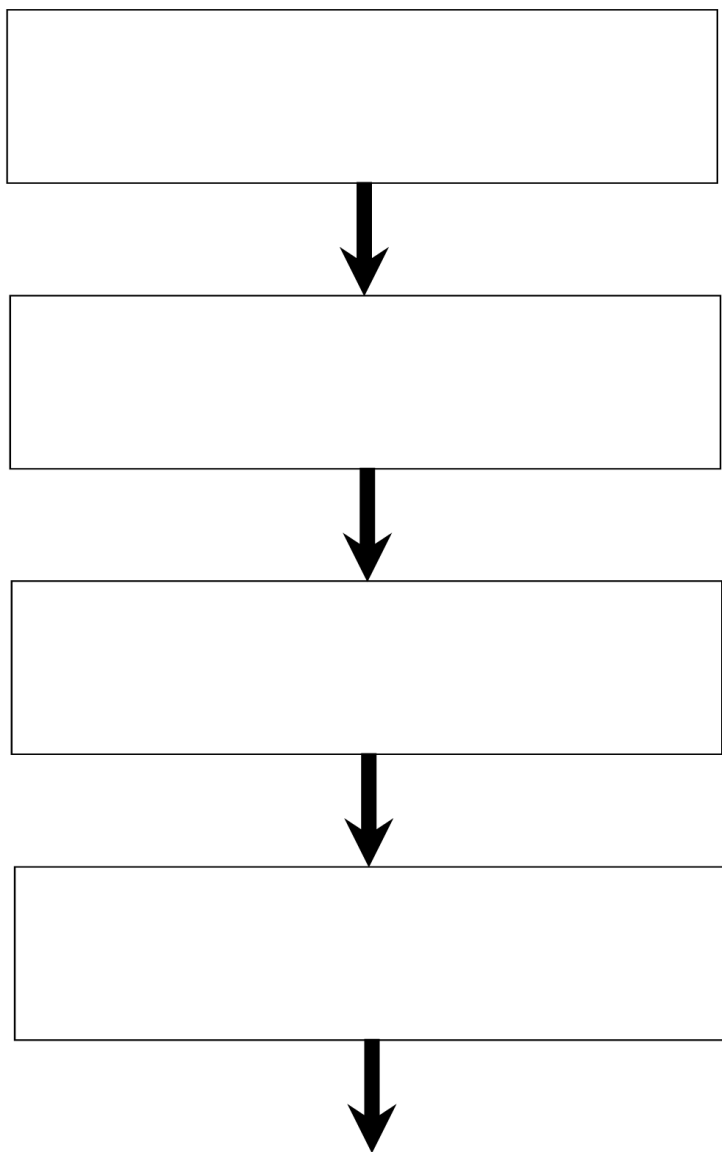
Final design (develop design and solution further):

Make:

Make a list of all the resources (tools and materials) needed. Also add the quantities or dimensions.

Materials	Quantity/Measurements
-----------	-----------------------

Draw a simple flow diagram to show the steps for making the product.(LO 7.1.3.1)



Draw a simple working drawing of your final product. Use colour, shade, thick and thin lines and shadow.

Evaluation

Product

Does the product satisfy the design brief? Explain.

Does the product satisfy the specifications and constraints? Explain.

Suggests any improvements to your final product.

Process

How well did your making compare to your planned steps?

Suggests any improvements to your plan of action.

Assessment

Learning Outcomes(LOs)
LO 1
TECHNOLOGICAL PROCESSES AND SKILLSThe learner will be able to apply technological processes and skills ethically and responsibly using

appropriate information and communication technologies.

Assessment Standards(ASs)

We know this when the learner:

investigates:

1.1 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

1.2 examines existing products relevant to a problem, situation or need.

1.3 investigates by performing simple practical tests relating to aspects of the technological knowledge areas (Structures, Processing, and Systems and Control);

1.4 during investigations, plans a strategy for collecting data and information.

design:

1.5 writes or communicates a short and clear statement or a design brief for the development of a product or system related to a given problem, need or opportunity;

1.6 lists product and design specifications and constraints for a solution to a given problem, need or opportunity.

1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

make:

1.9 develops a plan.

1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

evaluates:

1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

1.13 evaluates the efficiency of the plan of action followed and suggests improving future plans.

The need for clothing

TECHNOLOGY

Grade 7

PROCESSING: TEXTILES

Module 16

THE NEED FOR CLOTHING

INTRODUCTION

The need for clothing, like the need for food, is one of the most important human needs. In this module we are going to examine the textile industry and follow the process of manufacturing clothing, from the simple fibres used in producing fabrics to the final garment in which you will dress yourself.

WHY DO PEOPLE WEAR DIFFERENT GARMENTS?

Different garments have different functions. Let us look at the typical outfit worn by Venus and Serena Williams when they play tennis.



ASSIGNMENT 1:

[lo 1.1]

Make a list of their garments:

1. Is each garment suited to its function?
1. What makes it suited to its function?
1. What problems would they experience if their tennis dresses were made of the same fabric as their tracksuits?

Different occasions and different climatic conditions require that we wear different types of garments. All garments are made from different types of textiles. What are textiles?

Assessment

Learning Outcomes(LOs)
LO 1

TECHNOLOGICAL PROCESSES AND SKILLSThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

Assessment Standards(ASs)

We know this when the learner:

Investigates:1.1 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

Memorandum

1. tennis frock (tight-fitting)

pants suit

2. Yes

3. flexible – easy to move in / will not perspire

4. hot / perspire / difficult to move

The textile industry

TECHNOLOGY

Grade 7

PROCESSING: TEXTILES

Module 17

THE TEXTILE INDUSTRY

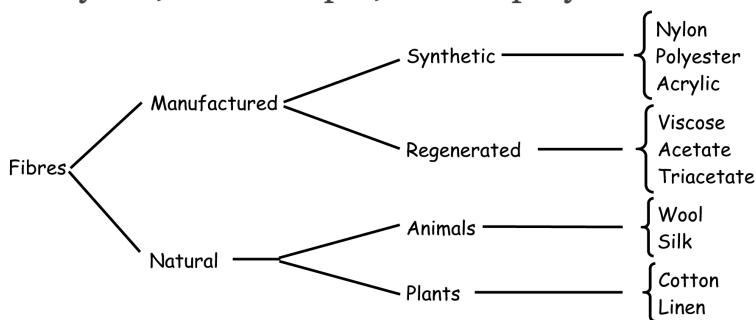
1. The history of the textile industry

The textile industry came into existence when

people discovered that the cover of hair from some animals (e.g. the sheep) could be used without slaughtering the animal. A method for using these fibres was then developed, through spinning them together to make yarn. The fibrous nature of some plants, like the flax plant, also made it possible to spin threads which could be woven into fabric.

Today, most fabrics are knitted or woven. Fibres that are used may be natural and may be obtained from plants or animals.

Fibres may also be synthetic (produced artificially). Such textiles are produced from minerals like coal and petroleum. Examples of artificial fibres are nylon, acrylic and polyester fibres. Sometimes artificial fibres are combined with natural fibres. In this way we, for example, obtain polyester cotton.



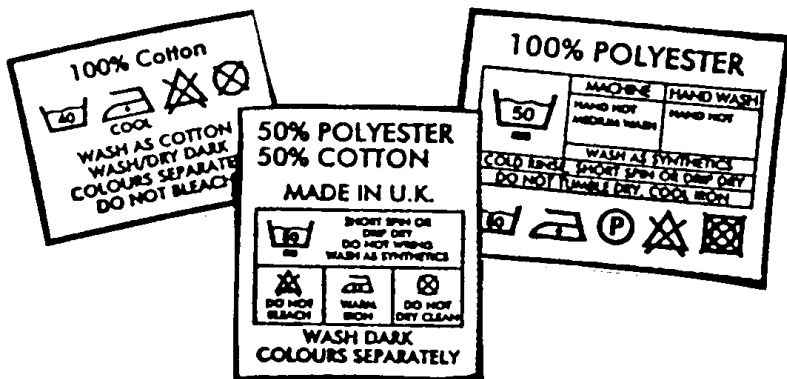
See how many garment labels that indicate that polyester-cotton was used for the manufacture of the fabric you can find.

1. Qualities of fibres

The length, density, strength, fineness and elasticity, as well as resistance to chemicals and moisture, determine the quality of the textile that is manufactured from a fibre. In this way, the qualities of the different types of fibres will determine the qualities of the fabrics that are made from them. The way in which fibres are knitted or woven also plays a role.

That is why a garment should have a label to describe the textile from which it is made, as well as give guidelines about how the garment should be taken care of or washed.

Study the following examples of such labels and talk about them in your groups:



1. Doing research on the different clothing fabrics

ASSIGNMENT 1:

[LO 1.1]

- Study the labels from 3 garments and complete the table that follows:

Garment	Description of textile	Washing instructions	Texture of fabric	Fabric mass	Elasticity of fabric
E.g.: T-shirt	100% cotton	Cold wash hand wash	Soft	Light	Not much

Because different types of fabric have different qualities, people choose different types of textiles for specific purposes. Soft fabrics are usually selected for garments that will be worn against the body, while other fabrics are needed for warm jerseys and jackets.

- The following table presents a summary of the qualities of different types of fibres and also indicates how articles made from these fibres

should be taken care of.

Fibre	Qualities	Care
Cotton	Cool Can absorb moisture Little elasticity Creases easily Very flammable Soft/ coarse, depending on weave	Machine or hand wash / Lukewarm Rinse thoroughly Hang up to dry or spin dry. Coloured cotton is faded by the sun Iron with warm iron Whites may be bleached
Wool	Keeps in warmth when wet Can shrink Does not crease easily	Dry clean / Hand wash Dry in shade / Lay down flat Avoid ironing, or cool iron
Artificial fibres	Strong Do not absorb moisture Dry easily Crease resistant Do not shrink or stretch (Lycra is an	Warm wash-machine or hand Hang up or spin dry Does not need ironing

exception) Melts
at high
temperatures

- Make use of the information you have gathered to select a suitable fabric for:
- a school shirt
- a winter jacket
- long trousers for a boy
- Fabric qualities:

Follow the instructions and draw up a table to record your observations.

1. **Durability:**

Choose three different types of fabric. You need to be reasonably sure that you know what fibres were used during the manufacturing process.

- Stretch the fabric over the open end of a tin and secure it in position with an elastic band.
- Rub a stone against the fabric, using even movements until a hole is formed.
- Compare the strength of the different fibres.
- **Flammability:**

Take the same pieces of fabric and hold them close to a flame. What do you observe?

1. Absorption of moisture:

Place the fabrics in water to see which one absorbs water most easily.

Place the wet fabric outside to see which one dries the fastest.

Fabric	1.		2.		3.	
Fibres						
Durability						
Flammability						
Absorption of moisture						

Assessment

LO 2

TECHNOLOGICAL KNOWLEDGE AND

UNDERSTANDINGThe learner will be able to understand and apply relevant technological knowledge ethically and responsibly.

Assessment Standards(ASs)

We know this when the learner:

Structures:2.1 demonstrates knowledge and understanding of structures.

Making a garment

TECHNOLOGY

Grade 7

PROCESSING: TEXTILES

Module 18

MAKING A GARMENT

MAKING A GARMENT

Before you can make a garment, you need to have a pattern. Patterns simply are sheets of paper or cardboard. Each pattern piece is shaped precisely and serves as a master copy according to which you cut the different parts of the garment out of fabric. It is possible to buy a different pattern for each garment or to use a basic pattern, like dressmakers, and adjust it according to need. But before you can cut out a pattern, you need to know what your measurements are.

1. Taking your measurements

Use a tape measure and write down the necessary measurements in the table. You will need a helper to take some of the measurements. Study the sketch on the following page to ensure that the measurements are taken correctly.

These are some important guidelines:

1. Be relaxed while your measurements are taken.
2. If you pull in your tummy, the garment may be too tight when it is finished.
3. Use the tape measure loosely rather than tightly. It is easy to cut away excess fabric if the pieces are too large, but you cannot add on fabric when they are too small.
4. If a measurement is not measurable to the

centimetre, round it off to the following centimetre.

5. Your body is still growing and you must make allowances for such growth.

Measurements	My measurements in cm	
Shoulder length		
Shoulder to waist		
Shoulder to hip		
Shoulder to chest line		
Chest		
Arm (length)		
Waist		
Hip		
Inner leg		
Outer leg		

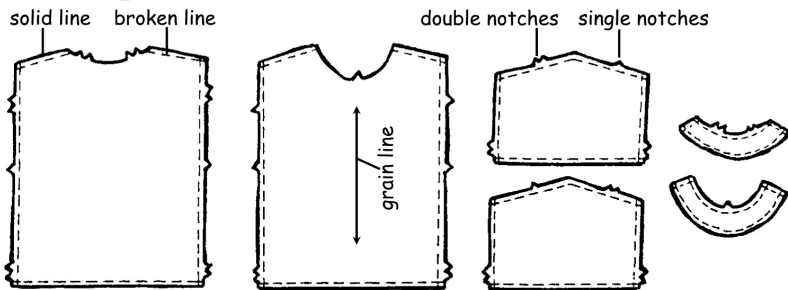
DISCUSS THIS WITH YOUR FRIEND:

- How would you adjust the above measurements when you want to make a loose-fitting T-shirt?
- Must pattern pieces be made to the exact size of the garment?
- How would you indicate where different pattern pieces have to be stitched to one

another?

- What fabric / kind of paper should be used to make pattern pieces?
- The pattern

The following shows a typical pattern for a garment. Can you suggest what kind of garment will be made from this pattern?



- The solid line indicates the edge of the pattern along which you have to cut.
- The dotted line that is 15 mm inside the solid line indicates the line along which the pattern pieces must be sewn to one another.
- This 15 mm-wide area is the seam allowance.
- You have to allow at least 30 mm at the lower edges of pattern pieces for hems when you are cutting out the pattern.
- The single and double notches show you where pattern pieces have to be aligned (placed together).

The arrow shows how the pattern piece must be laid on the fabric when you want to cut it out.

THE PRODUCT

Designing my own pattern

- You are going to design a pattern for a T-shirt for yourself.
- How long should the T-shirt be?
- Should the neckline be rounded or V-shaped?
- The neck opening should slip over your head. How are you going to achieve this?
- Should the shirt fit or be loose?
- What type of fabric will suit the purpose of the shirt?
- What type of fabric will you use?
- Must it be soft / elastic / absorbent?
- Must it be expensive? For what purpose will you use it?
- Must the fabric be colourful or plain?
- Will you decorate it with some painting or appliqué?
- Must the fabric be crease resistant? Do you like ironing?
- Must the fabric have specific instructions for

- washing?
- The design stage

You will need:

- newspaper
- pencil
- tape measure
- pins / sellotape
- old shirts
- brown paper / unprinted paper

ASSIGNMENT 1:

[lo 1.12]

Step 1:

Try on the old shirt to see whether it still fits you properly. If the fit is slightly tight or loose, you must bear this in mind so that you can make adjustments to the width at the seams.

Step 2:

Carefully unpick the seams of the old shirt. Place

the different parts on a large sheet of newspaper and trace the outlines carefully, using a pencil. At this stage you must ensure that the shirt will fit properly. If necessary, you must use a tape measure and adjust the measurements of different parts to do so. If you should like to change the style, it must also be done at this point. You might decide to change the round neckline to a V-neckline, to have long sleeves instead of short sleeves, or to cut the shirt shorter, and so on.

Step 3:

Cut out the different pattern pieces and pin them together, using straight pins. Fit the pattern loosely around you to see how you are managing. Check whether you have made proper allowance for all the seams and hems. Is the length correct? Are the sleeves long enough? Check all aspects of the pattern. Then indicate the notches that will ensure that you fit the different pattern pieces together correctly.

Step 4:

You may now remove the pins and lay out the pattern pieces neatly on unprinted paper before tracing the final pattern. Cut out these pattern pieces.

Step 5:

Study the different pieces of a bought pattern to find out as much as you can about the information that is given on the different pattern pieces. Try to transfer the most important information to your own pattern pieces, e.g.:

- How many of each pattern piece you need to cut out (you will have one pattern piece for a sleeve, because the sleeves will be the same).
- How many cm are allowed for seams.
- the direction in which the pattern pieces should be laid on the fabric.
- The name of the pattern piece: this probably is the most important information.
- Whether the pattern piece should be laid against a fold?

Step 6:

Fabric is usually sold in 3 approximate widths: 900 mm; 1 150 mm or 1 500 mm. Join newspapers together to obtain these widths and lay your pattern pieces out on these to try to work out approximately how much fabric you will need for your garment.

Step 7:

Get suitable cloth for your garment. (You need not use expensive fabric).

Lay out the pattern pieces on the fabric according to the necessary specifications and pin them to the

fabric. (It is important to work on a clean, smooth surface that is large enough).

Cut out the pattern, using a sharp pair of scissors. Work with care to ensure that you indicate all the notches clearly. Try to keep your cutting line straight, with long even cuts. Do not unpin the pattern from the fabric, or you might have difficulty in recognising the different parts afterwards.

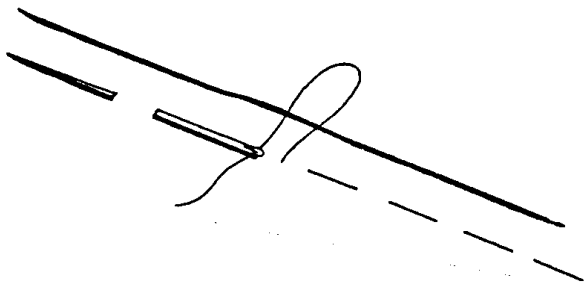
1. Making the shirt

1. Hand sewing or sewing machine?

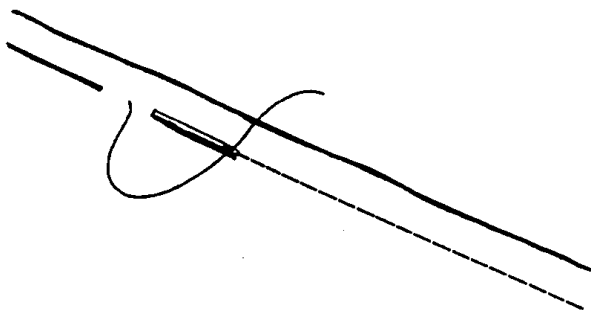
Do not become discouraged if you do not know how to use a sewing machine, or do not have one available. You can manage equally well with a needle and tread.

Study the sketches below to learn more about the basic stitches that you will need for seams and hems. Practise sewing them on a piece of fabric.

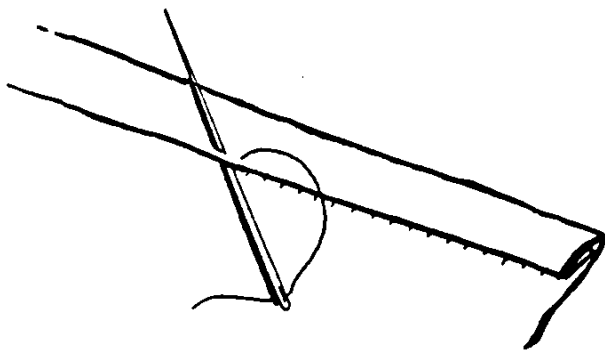
1. **Tacking stitch:** If the stitches are long, they are meant to hold the pieces of the pattern together temporarily. If the stitches are fine and close together, they can be regarded as permanent stitches. You usually start your sewing with a knot in the thread.



1. **Backstitch:** These very small stitches form a sturdy seam. At the beginning and the end of a seam, the thread should be worked in firmly.



1. **Hem stitch:** Small, slanted stitches that are used to sew hems. They should preferably not show on the right side of the fabric. Sew the thread in securely at the beginning and at the end of a hem.



1. We'll finish the shirt step by step.

What do you need?

- Cut out pattern pieces.
- Thread to match the fabric.
- Tacking thread in a different colour.
- Pins.
- needle.
- A sharp pair of scissors.

Do the work as follows:

- Sew the facings for the front and back to the neckline edges. Remember to pin it in place first, then to tack and then to stitch. Iron the seams flat.
- Sew front and back sections together at the shoulders (right sides of fabric must be placed together). Iron the seams neatly.
- Sew both sleeves to the arm openings.
- Sew the side and sleeve seams (underarm

- seams) all the way to the sleeve edge.
- Decide how long the sleeves and the shirt body should be, pin the hems, tack and sew neatly. Iron, if necessary.

Neatly sew down the facing around the neckline, using hemstitch. Iron the whole garment, if necessary.

1. Fitting:

You may now try on the shirt to see what it looks like. If it is a loose-fitting T-shirt, seams that aren't perfectly straight will not be too noticeable.

Next, you can organise a competition to design a suitable emblem for grade seven and paint it on your shirts, using fabric paint. By doing this, you will be creating a garment that will always remain unique and remind you of your grade seven year.

How successful is my product?

Next, you as a class must, under leadership of you educator, establish a set of criteria that you could apply to evaluate your final product, which, in this case, is the T-shirt. Make use of factors such as the following:

1. how well does the shirt fit?

2. is it comfortable?
3. how good is the finish?
4. is the emblem striking?
5. is the fabric that was selected suitable?
6. and so on ...

Set up a standard table according to which each item (shirt) that was made can be evaluated and choose a winning T-shirt.

Assessment

Learning Outcomes(LOs)

LO 1

TECHNOLOGICAL PROCESSES AND SKILLSThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

Assessment Standards(ASs)

We know this when the learner:

Investigates:1.1 investigates the background context, the nature of the need, the environmental situation, and the people concerned when given a problem, need or opportunity set in a local context;

Evaluates:1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications.

What is food technology?

TECHNOLOGY

Grade 7

PROCESSING: FOOD TECHNOLOGY

Module 19

WHAT IS FOOD TECHNOLOGY?

1. What is food technology?

Food technology incorporates a broad field of study,

but definitely deals with altering raw materials to food products. Raw materials include items such as bananas, fish, grains of wheat and potatoes. Some of these raw materials can be eaten as they are; bananas, for example. Other raw materials need to be processed before they can be presented as tasty. We need to distinguish between two core ideas: **primary processing** and **secondary processing**. **Primary processing** involves a process in which a raw material is made into a usable product (grains of wheat, for instance, are made into flour). When the flour is used to bake bread, we have to do with **secondary processing**.

ASSIGNMENT 1:

[lo 2.2]

Illustrate examples of your own of primary and secondary processing

When we apply the process of food technology, it is necessary to have acquired particular knowledge and skills. We shall learn about different ingredients and their nutritive values. We shall have to be able to use particular tools and equipment effectively to

be able to produce food products and we also have to understand why it is important to know about safety precautions and hygiene. To produce a product that will be popular, we shall have to do the necessary research, which will require knowledge related to the utilisation of computers and appropriate software. Sometimes the food technology process involves developing particular recipes and it might often be necessary to follow instructions precisely. Every successful enterprise, including food technology, also requires quality control. *Are the ingredients that I use in my product safe in all instances?* is only one of the questions that a food technologist has to ask.

ASSIGNMENT 2:

[LO 2.2]

Answer the following questions:

1. Make a list of a number of foods that can be eaten raw, without any processing. Explain how two foods can be processed to become other products, for example: Meat (raw material) is dried to provide biltong (processed

material).

1. Design a memory chart to provide a clear illustration of the knowledge and skills that are required in the world of food technology.
2. HYGIENE AND SAFETY

1. Food hygiene and personal hygiene

Before designing a food product, you need to increase your knowledge of food hygiene, or you might design a food product that is unsafe for consumption by people!

Food hygiene consists of a set of rules that are directed towards keeping food clean. The main methods for keeping food clean are:

- protecting food against bacteria;
- preventing bacteria from multiplying in food, and
- destroying bacteria by means of cooking.

Poor food hygiene in the food industry often leads to food poisoning. This can lead to legal steps being taken by clients against an enterprise, which may result in heavy fines. To sell food that is unsafe to eat is a contravention of the *Food Safety Act of 1990* and this law states that the food industry must do everything in its power to ensure that food in whatever processed form must be safe to eat. There are certain basic principles that can be applied by

the individual to ensure that food is protected from bacteria. The core concept to be emphasised here is **personal hygiene**. Try to respect the following recommendations when you work with food:

- Clean hands

We use our hands to handle food in most instances and it is therefore important that our hands must be exceptionally clean. Be sure to wash your hands after using the toilet. In any case, wash your hands before working with raw materials or such-like food products. People who are employed in the food industry usually wash their hands with an **anti-bacterial detergent** before handling food.

- Injuries

It is unwise to handle food after you have sustained a cut, especially if the wound is on your hand. The foodstuff then comes into direct contact with body fluids and bacteria are able to enter the food.

- Clothing

Your clothing can also contribute to the transfer of bacteria. Hair, especially, contribute to transferring bacteria, so people who work in food factories wear nets to cover their hair as a method of protection.

- Condition of health

If you are unwell and suffer from a condition like diarrhoea, you should preferably not work with food. Dangerous bacteria that can cause food poisoning could be transferred to the food.

- Smoking

People may not smoke while they are involved in working with food. The danger comes from the fact that a person who is smoking might touch the lips when a cigarette is removed from the mouth. In this way, bacteria from the lips can be transferred to the food.

- Work environment

It is obvious that the area where the work takes place must be kept very clean. Although there is much that can be done to keep your immediate environment clean, it is a prerequisite to first clean the surface on which you plan to work with an antibacterial spray.

ASSIGNMENT 3:

[LO 1.2]

Execute the following instructions:

1. Differentiate between the core concepts food hygiene and personal hygiene with the help of a class discussion.
2. Design a memory chart to indicate what one should do to ensure personal hygiene.

1. FOOD SAFETY

Food safety comprises the process according to which you ensure that food is safe to eat, in order to avoid food poisoning.

- What causes food poisoning?

A variety of factors can lead to food poisoning, but the presence of bacteria probably is the main cause. Although most kinds of bacteria are harmless, some types can result in food poisoning. The symptoms normally include nausea, diarrhoea, stomach cramps and fever. In some instances food poisoning can lead to death. Bacteria are microorganisms that can only be seen with the help of a microscope. There are bacteria that can be utilised very advantageously, for example those that are used to make cheese. Bacteria increase extremely rapidly under the right circumstances. They develop at temperatures between 5 degrees Celsius and 63 degrees Celsius. They, however, flourish at temperatures that are more or less the same as body temperature, i.e. 37 degrees Celsius. It is interesting

to note that their numbers double within 10 to 20 minutes when conditions are ideal. One bacterium can therefore increase to several thousands within five hours.

It is important to take note of the conditions that stimulate the growth of bacteria. When these factors are known, it is easier to take steps to prevent their growth.

Warmth

The temperature range between 5 and 63 degrees Celsius is rated as the danger zone because bacteria are able to grow at these temperatures. If we are able to keep the temperature either above 63 degrees Celsius or below 5 degrees Celsius, it becomes impossible for bacteria to multiply further. Boiling food at 70 degrees Celsius for at least two minutes is recommended - in this way all bacteria are

	destroyed.
Moisture	Bacteria need moisture for their development. Have you ever wondered why biltong has such an extended shelf life? It is because there is not enough moisture in the dried meat for bacteria to flourish.
Foods rich in protein	Bacteria prefer foods that have high levels of protein such as meat, eggs and fish. We can regard these foods as high-risk foods.
Time	We have already stated that bacteria are able to multiply very quickly when circumstances are ideal. Food must therefore not be kept for too long under warm conditions.

People who handle food should try to avoid the following dangerous practices:

- not cooking food for long enough;
- preparing food and then leaving it to stand for a long time before eating it;
- transferring bacteria from raw materials to

- cooked food;
- not storing food in a freezer;
- not thawing foods such as frozen chicken properly.

Develop the habit of studying the label on a food item properly before buying it. The label indicates the expiry date of the item for the information of the consumer. The expiry date is determined by scientists and food technologists. Later in the module you will be given an opportunity to design your own food product and then you will also have to make your own label.

It would seem that knowledge of the relationship between temperature and bacteria is important, especially with producing your own food products in view. We therefore recommend that you fill in the following table as precisely as possible:

ASSIGNMENT 4:

Degrees Celsius	100; 72; 63; 37; 25; 5; 0; 18
-----------------	----------------------------------

Choose the temperature from the above table that best suits the description in the following table:

FOOD TEMPERATURE CHART		
Room temperature		
Freezer temperature		
Freezing point of water		
Boiling point of water		
Pasteurization temperature		
Fridge temperature		
Body temperature		
Very hot - bacteria are destroyed		

ASSIGNMENT 5:

[LO 1.2]

Form a panel of "food technologists" for a discussion on the subject *Food Safety*.

Suggestions for setting up the panel:

- A panel usually comprises three to five members and has a leader who stimulates the responses of the rest of the panel by means of questions.
- Each member is given a subdivision of the subject, which he or she has to prepare thoroughly. The group leader knows which subdivision is allocated to each of the members and prepares the questions accordingly.
- The group leader introduces the panel to the rest of the class and begins to put the questions to the different members of the panel.
- After the questions have been dealt with, the class has an opportunity to put further questions to the panel.

Designing your own food product

- Steps to take during the planning and production of your food product.

The following steps may give you good guidance while you are planning and producing your product. The various steps are presented diagrammatically and then the meaning of each is explained briefly.



ANALYSE THE SUGGESTED DESIGN
COLLECT RESEARCH RESULTS
EXAMINE IDEAS
WRITE OUT A SPECIFICATION
PLAN AND PRODUCE THE FOOD PRODUCT
QUALITY CONTROL
EVALUATE THE SUCCESS OF THE FOOD PRODUCT

1. Analyse the suggested design

Planning and making of the food product begins with the analysis of the suggested design. Here is the suggested design for this module:

Plan and produce an energy bar to be eaten by sports people to improve their energy levels before an important sports meeting.

Analysing the suggested design carefully makes it clear that the successful food product has to:

- be in the shape of a bar;
- release energy after being eaten; and
- be attractive to sportsmen and women.
- Collect research results

It is wise to take a look at similar products and ideas. Do consult recipe books, magazines and newspapers. Visit several cafes and shops and do not hesitate to talk to people about their preferences and dislikes. Try to arrange an interview with a

dietician to discuss the suggested design and study the labels of similar existing products thoroughly.

1. Write out a specification

The specification actually is a summary of the prerequisites that are listed in the suggested design. In this instance the specification will be as follows:

- The shape of the sweet must be that of a bar.
- The ingredients must be tasty and the bar must therefore taste good.
- The ingredients must be of such a nature that energy is released quickly.
- The ingredients must not run the risk of being regarded as a stimulant.
- It must be affordable.
- Name and description of the product.
- Size, shape and appearance.
- Ingredients and amounts.
- Recipe (how it is made).
- Shelf life and storage requirements.
- Planning and production of your food product

Some people think that there is only one way of planning and production. When you are busy planning and producing your energy bar, you really must allow your ability to think creatively and work out solutions and suggestions to come to the fore. Accept that the way you think will be different to your friend's way of thinking and that you will do

things differently. You could ask your friend's opinion for evaluating your product, but never expect your product to be similar to your friend's.

Here is some useful information that you could apply while planning and producing your energy bar:

WHY ARE ENERGY BARS SO POPULAR? **They are healthy.** Eating them supplies the body with carbohydrates, vitamins and minerals, as well as fibre and proteins. This usually sustains any sportsman or sportswoman. Energy bars are easily digested and supply glucose to the muscles. **Energy bars are convenient.** Because most energy bars weigh between 30 and 80g sports people can accommodate them easily. Think about

runners and cyclists, for instance, who do not have much space for packing snacks when they

compete. RECIPE FOR AN ENERGY BAR FOR CYCLISTS

Ingredients

- 24 dried figs
- 24 teaspoons baking powder
- 1/2 cup honey
- 1/2 cup cooking oil
- 1/4 cup orange juice
- 1/4 cup lemon juice
- 2 whole eggs
- 1/2 cup Jungle Oats
- 1/2 cup soda

Instructions Blend figs, honey, orange juice and lemon juice in a blender. Mix other ingredients (except Jungle Oats) separately. Combine the mixtures and roll into balls of golf ball size (the mixture is enough for approximately 20 such balls). Cover the balls with the Jungle Oats and bake them @ 350° Fahrenheit for 10 - 15 minutes (try to work out the equivalent degrees in Celsius). Store the product in the refrigerator.

1. Evaluation of the product

It is important to accept that your first attempt may not produce the best product. Make use of your friends to evaluate the acceptability of your energy bar. Also do not be oversensitive about criticism. Apply the recommendations of your friends and remember that those who might buy your product will be looking at it as critically as your friends. Do make use of a tasting panel. Tasting panels are used to give a number of people the opportunity to judge a product. It is advisable to ask more than one person to give an opinion on the success of your product. The larger the group, the more varied the opinions that you will get. Try to adjust your product to suit the requirements of most of the people in the tasting panel.

Assessment

Learning outcomes(LOs)
LO 1

Technological Processes and SkillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

Assessment standards(ASs)

We know this when the learner:

Investigate:1.2 examines existing products relevant to a problem, situation or need.

Design:1.5 writes or communicates a short and clear statement or a design brief for the development of a product or system related to a given problem, need or opportunity;

Evaluates:1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications

LO 2

Technological Knowledge and UnderstandingThe learner will be able to understand and apply relevant technological knowledge ethically and responsibly.

Assessment standards(ASs)

We know this when the learner:

Processing:2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

Structures

TECHNOLOGY

Grade 7

STRUCTURES AND COMMUNICATION

Module 20

STRUCTURES

Demonstrates knowledge and understanding of structures in terms of:

- specific properties and use of material (e.g. water resistance, thermal insulation, fire resistance);
- stability (e.g. base size, centre of gravity);
- strengthening (e.g. corrugation, laminating, reinforcing);
- joining techniques.

SPECIFIC PROPERTIES AND USE OF MATERIAL

Background

Structures are designed and built to stand up to certain loads or forces. The strength of a structure are determined by

- the strength of the materials making up the structure;
- the quality of the joints between the parts;
- the shape of the parts;
- the way the parts are arranged together.

THERMAL INSULATION is when materials like plastic is made strong so that they will be resistant to heat. Once formed into a shape they cannot be reshaped, because they show resistance to heat. Although they are quite hard, they can be chipped or cracked by being dropped or banged. Examples of such plastics are the bodies of some cars, some glues, work surfaces in some kitchens, the handles of saucepans, good quality electrical fittings like the

fittings on light switches and some bowls, jars and glasses.

ASSIGNMENT 1:

To find examples of structures

[LO 2.1]

Look for pictures of examples of structures that were formed by using thermal insulation and paste them on a sheet of paper.

Structures that have FIRE RESISTANCE, shows some resistance against heat. Structures that are WATER RESISTANT, show some resistance against water and can be easily submerged into water without getting wet or damaged.

Strengthening

Ways of strengthening structures are through:

- CORRUGATION, like some cans and asbestos roofs;
- LAMINATING, e.g. to cover placemats or pieces of wood with plastic.

LAMINATING; like the strengthening of placemats with plastic or to make permanently bent pieces of wood. Wood is often thought as a rigid material, because it will bend and usually springs back into shape when released. Because wood is ‘springy’ it is not easy to make bent or curved shapes from straight pieces of wood, but by laminating wood you can bend it. Thin layers of wood are glued together. A thin layer of wood is easy to bend. Each layer has glue put on it and is bent into shape around a former. The whole shape is held in the former until the glue sets. Laminating can be used for small things like tennis rackets and chairs, or for large things like roof beams. Have you heard about laminated floors? How is it made?

Assessment

LO 2

TECHNOLOGICAL KNOWLEDGE AND

UNDERSTANDING The learner will be able to understand and apply relevant technological knowledge ethically and responsibly.

Assessment standards (ASs)

We know this when the learner:

structures:

2.1 demonstrates knowledge and understanding of structures.

processing: 2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

We know this when the learner:

impact of Technology:

3.2 expresses some reasons why products of technology affect the quality of people's lives positively and negatively.

Make your own laminated bracelet

TECHNOLOGY

Grade 7

STRUCTURES AND COMMUNICATION

Module 21

MAKE YOUR OWN LAMINATED BRACELET

Make your own wooden bracelet by laminating wood

[LO 2.1]

Requirements :

- a tongue depressor
- a bowl of warm water
- a clean empty frozen-juice container
- rubber bands
- poster paint and a paint brush
- sequins
- clear varnish

Method :

1. Soak the wooden tongue depressor in warm water for about an hour, until you can gently bend it around a frozen-juice container. Place rubber bands on top of the tongue depressor to hold it in place. Let dry for one day.
2. Remove the tongue depressor, cover it with poster paint, and let dry.

3. Glue on sequins or other trims. Let dry.
4. Cover with clear varnish.

Assessment

LO 2

TECHNOLOGICAL KNOWLEDGE AND

UNDERSTANDING The learner will be able to understand and apply relevant technological knowledge ethically and responsibly.

Assessment standards (ASs)

We know this when the learner:
structures:

2.1 demonstrates knowledge and understanding of structures.

processing: 2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

We know this when the learner:
impact of Technology:

3.2 expresses some reasons why products of technology affect the quality of people's lives positively and negatively.

Reinforcing doors and windows

TECHNOLOGY

Grade 7

STRUCTURES AND COMMUNICATION

Module 22

REINFORCING DOORS AND WINDOWS

REINFORCING, by using concrete and lintels over doors and window openings.

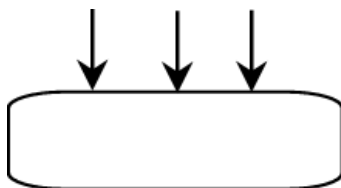
Stability

Structures are stabilized to prevent them from collapsing when forces or loads are put on them. To prevent a structure from falling down or collapsing we must try to make the internal forces bigger than the external forces under all conditions. How can you prevent a chair from collapsing when you sit on it? There are rails acting as ties at the bottom holding the legs together and preventing the legs from being pushed outwards.

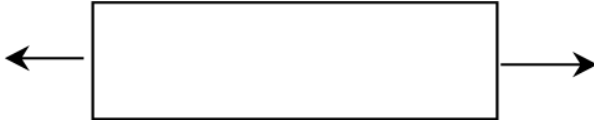
A flagpole doesn't need any supports under normal conditions. When the wind blows it can be supported by using guy ropes or ties that are flexible, but stop the poles from bending too far.

Different forces can act on different parts of a structure. Forces that structures have to stand up to are:

- Compression – when we try to squash a structure (a squashing force).



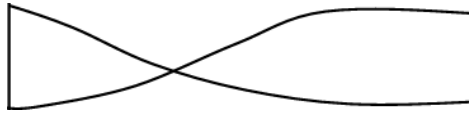
- Tension – when we try to pull a structure apart from either end (a pulling force).



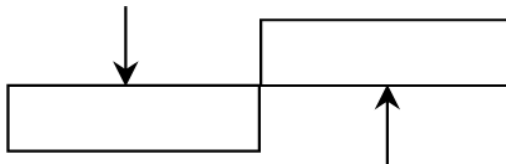
- Bending – a force which is trying to bend a structure and it is in compression and tension simultaneously.



- Torsion – a turning or twisting force like when you twist the top off a bottle.



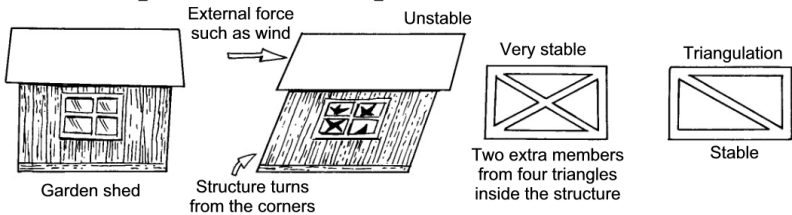
- Shear – a force created when two opposite forces try to cut a material; like when you use a pair of scissors to cut a piece of paper.



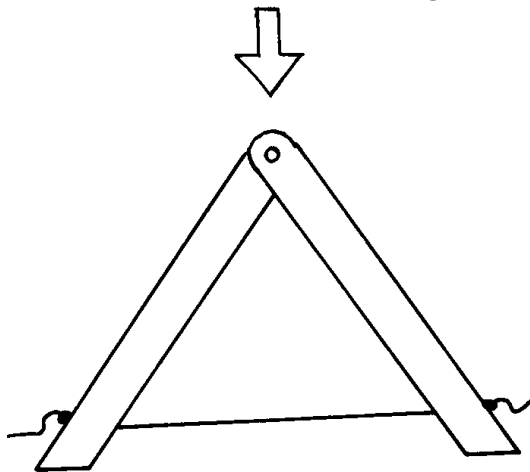
When one force is balanced by another they are said to be in EQUILIBRIUM.

When you build a structure, you do not always have

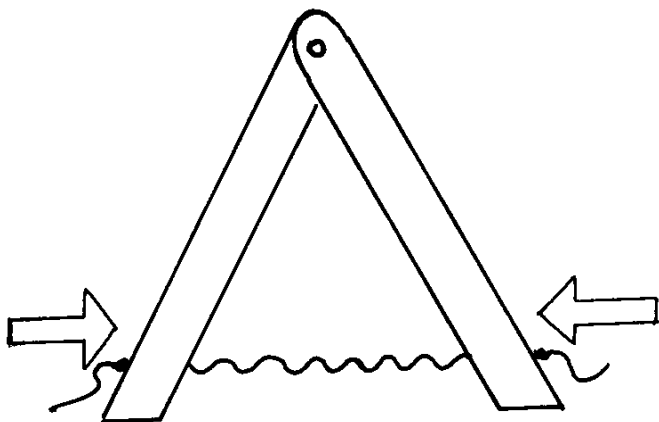
to use solid material like wood or metal. Flexible material, such as wire, can be used for parts of the structure which will only be stretched or in tension. Wire can be used in tension (being stretched), but not in compression (be squashed).



Load from the top of the structure keeps the wire in tension and the structure remains rigid.



When the structure is loaded from the sides the wire is compressed (squashed) and it collapses. It is unstable.



Triangles are very useful when building structures. They can help to make a very strong and rigid structure. To make a rectangle more stable is to put in two more members from corner to corner. Four triangles are formed. This way of making structures more stable is called TRIANGULATION. It is often used when building bridges or cranes. It is not always necessary to put in two members, one would be enough. The second extra member is called the redundant member. When designing structures it is easy to use more members than are really needed. They will only add more weight to the finished structure and make it more expensive.

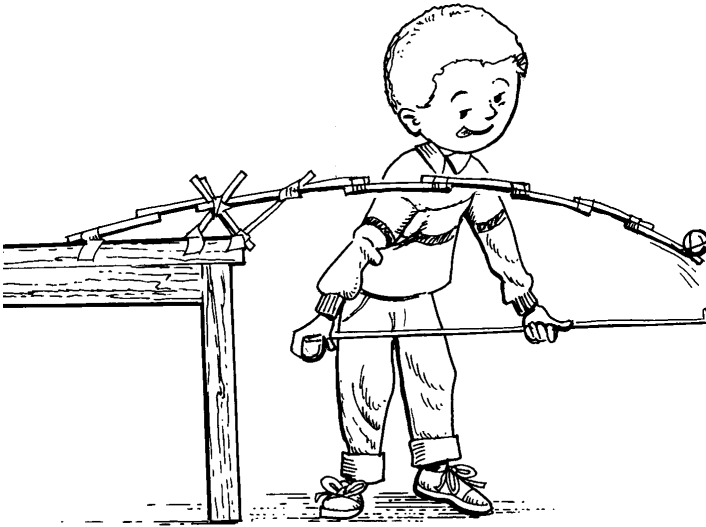
By making the base size of a structure heavier or wider, you can also make it more stable.

ASSIGNMENT 1 (groupwork):

[LO 2.1]

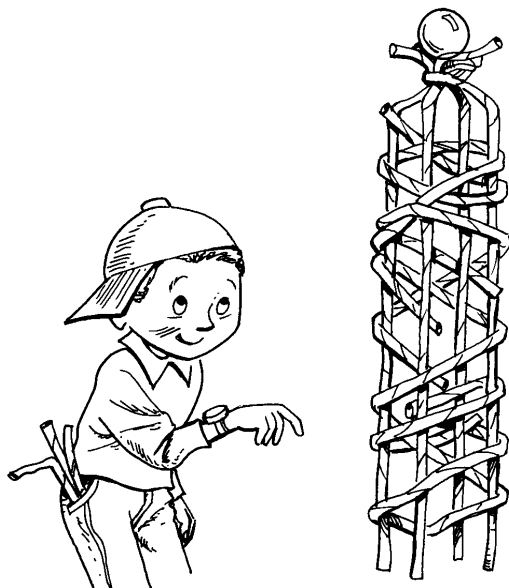
Choice 1:

Design and make a horizontal structure using 25 paper straws and a glue gun. Your structure must support a marble as far out from the table as possible. Your structure must not come in contact with the floor or any of the other furniture in the room. It must support the marble for at least 30 seconds.



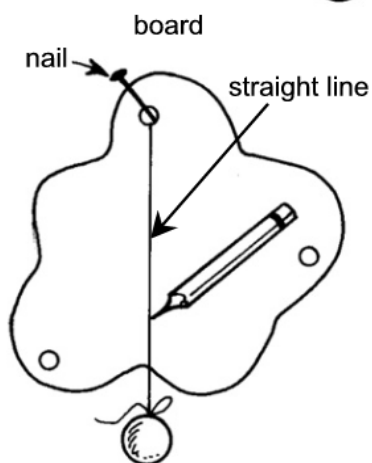
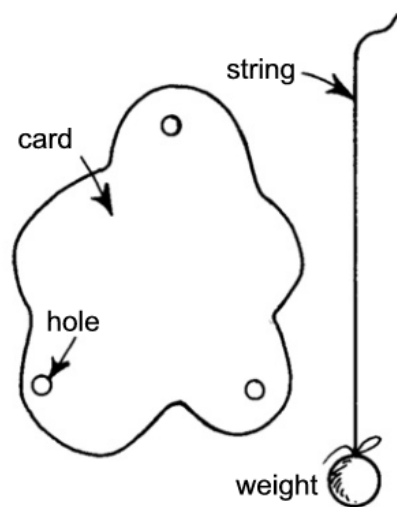
Choice 2:

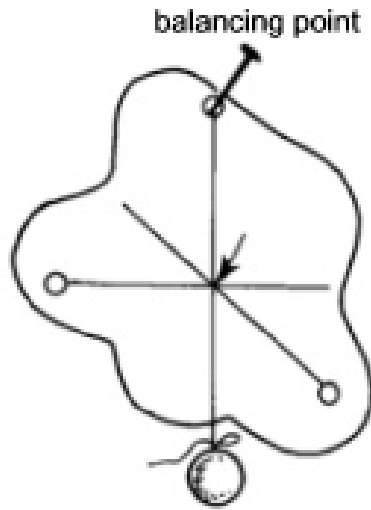
Design and make a tower using 25 paper straws and a glue gun. Your tower must support a marble for at least 30 seconds as high as possible.



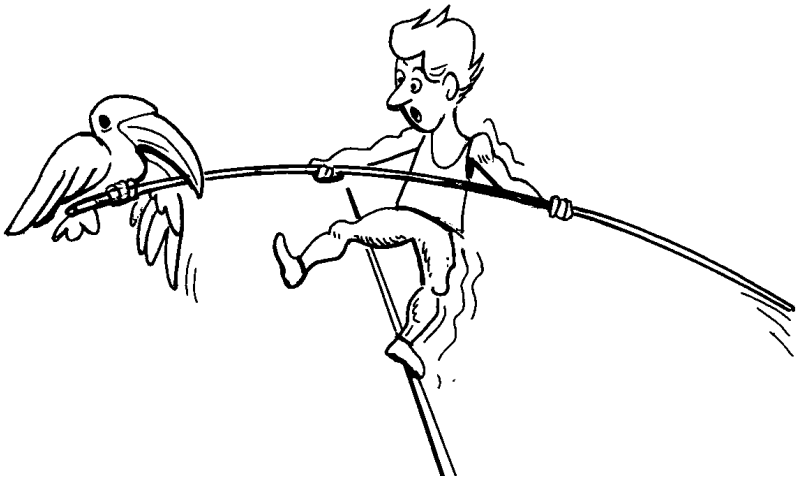
It is also important to get a structure's centre of gravity so that it is able to balance. All objects have a point where they are held in balance by the force of gravity. This balancing point is called the centre of gravity, because it is the place where the whole weight of the object seems to centre. The balancing point of a rectangular shape, such as a square or a circle, is in the centre.

How can you find the balancing point of an irregular shape?





Where do you think is the best place for the heavy cargo to be stowed on a ship?

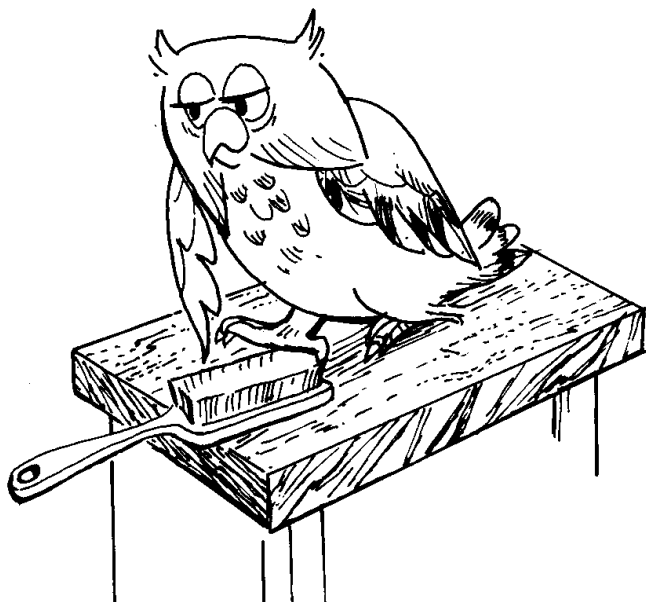


Gravity is the pull that objects have on other objects around them. Because the Earth itself is the largest object in our world, the pull of its gravity is the strongest we can feel. Gravity keeps everything resting on the ground. An object centre of gravity is

found when it just balances on the edge of a table before it falls off.

Any object will balance on a pivot when its centre of gravity is low.

How can you change an object's centre of gravity?



ASSIGNMENT 2:

To make your own trapeze artist

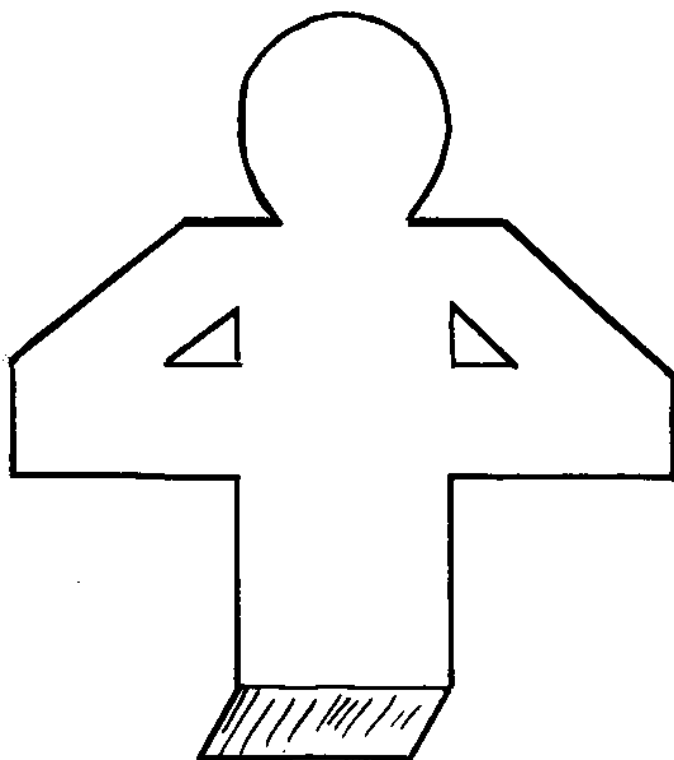
[LO 2.1]

Requirements :

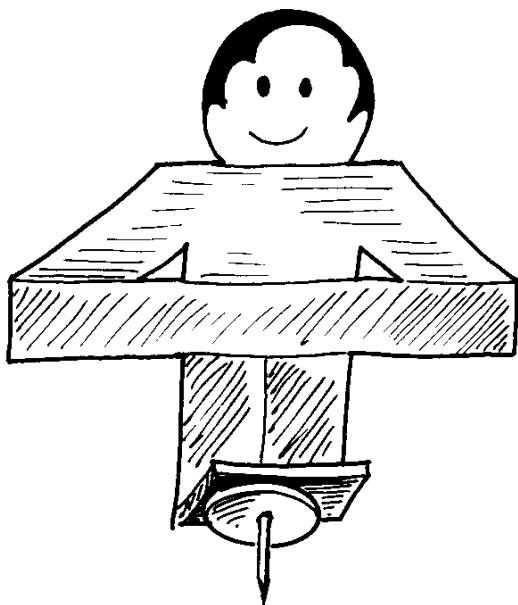
- Thick white card
- a drawing pin
- a scissors
- felt tip pens
- strong glue
- wire
- 2 plasticine balls
- a heavy bottle
- a glue gun
- pliers

Method:

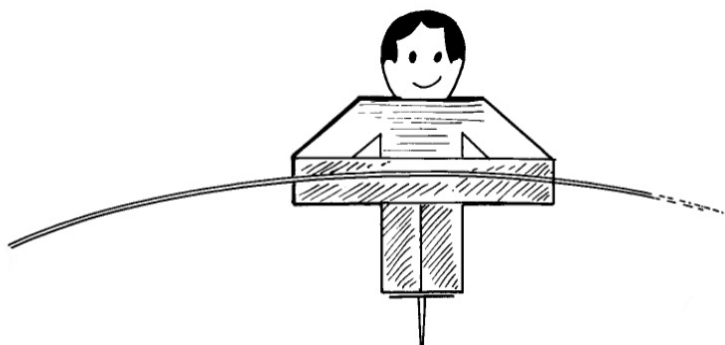
1. Draw the man shape onto some thick white card. Carefully cut out the shape with scissors.



1. Colour in the man to make him more human in the front and back using felt tip pens. Carefully glue a drawing pin to the bottom of the card.



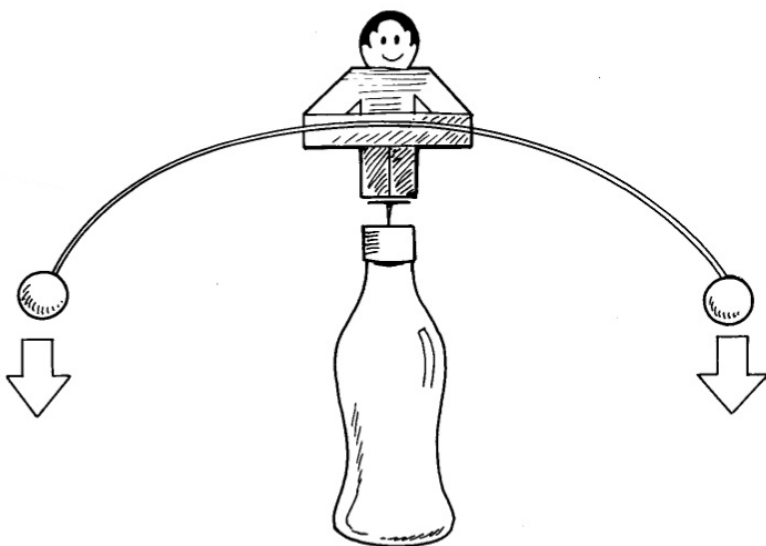
1. Cut of a length of wire using pliers. Glue it into place with the glue gun.



1. Glue two plasticine balls to each end of the wire.



4. Carefully stand the balancing man on top of a bottle. He wobbles slightly, but should keep his balance.



JOINING TECHNIQUES

Paper/card

Glue, paper clips, a

		stapler, paper fasteners, washers, string or yarn, tape, pins
Textile		Textile glue glues material onto material, PVA glue glues material to paper, card or wood, string , yarn, fasteners (buttons, velcro, zips, hooks and eyes, snap-fasteners, press-studs, strings, laces, ribbon)
Wood		Nails, pins, screws, woodglue, joints
Metal		Screws, bolts and nuts, soldering, glue, rivets
Plastic		Screws, glue

Assessment

Assessment standards (ASs)

We know this when the learner:
structures:

2.1 demonstrates knowledge and understanding of

structures.

processing:2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

Project Portfolio

TECHNOLOGY

Grade 7

STRUCTURES AND COMMUNICATION

Module 23

Project Portfolio

ASSIGNMENT 1:

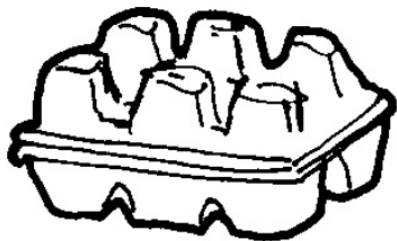
[LO 2.2]

Look for examples of various containers in magazines and cut them out. Some of the examples will be containers for A SPECIAL PURPOSE such as an egg box, a milk carton and a toolbox. Other will be containers with GENERAL USES such as a basket and a briefcase. Paste at least five examples of each type on a sheet of paper and complete the questions about each example:

Questions:

1. Who/ What is it for?
2. What is it made of?
3. Is it relatively expensive or cheap?
4. Can it be used many times or only once?
5. Is it environment friendly/biodegradable or will it pollute the environment?
6. Is it durable or will it easily break?

- SPECIAL PURPOSE CONTAINERS



- CONTAINERS FOR GENERAL USAGE

ASSIGNMENT 2:

[LO 3.2]

To complete a list of different types of containers that are advantageous to people

ASSIGNMENT 3:

[LO 3.2]

To compile a list of different types of containers that are harmful to the environment

Design brief

Design and make a luxury container that you will like to keep.

ASSIGNMENT 4:

[LO 1.6]

To write down the specifications of your job

Write the specifications for your product by answering the following questions:

1. What will it hold/ What will it be for?
2. What type of shape should it be?
3. What must it look like?
4. How must the lid be fixed to the box?
5. Will it be for everyday use or for special occasions only?
6. How will the lid open and close (locking mechanism)?
7. What form do you want the container to take?

(exciting, simple, beautiful, elegant, functional)

8. What are the most suitable materials for a luxury package?

- type of card: smooth, shiny, thick, thin, coloured
- What type of cardboard do you want to use for the reinforcement inside?
- What type of wood do you want to use for the reinforcement and decoration on the outside?
- What type of material do you want to use on the inside to give it a nice interior? (velvet, satin, silk, felt).

MAKE/ MANUFACTURING

ASSIGNMENT 5:

[LO 1.9]

To make a treasure chest

Instructions for making the treasure chest.

1. Place the net, the carbon copy paper and the

A4 cardboard on top of one another in that order.

2. Using a pencil and a ruler, copy the 2D-form on the cardboard. First draw the solid lines and then the interrupted lines. Check if all of them have been drawn. Make sure that it doesn't shift.

- What are the use of the solid lines?
- What are the use of the interrupted lines?
- Cut out the 2Dshape along the uninterrupted / solid lines with a scissors.
- Notch the dotted lines on the side where the carbon copy markings are, using an awl and a safety ruler. Work on a suitable surface. Practice first so that you don't make the notches too deep.
- Fold the card on the dotted lines, using a ruler.
- Apply glue to the flaps and model the chest (flaps to the outside). Hold firmly in position so that the chest can dry properly. (Do not use too much glue. The surface must just be slightly sticky.)

ASSIGNMENT 6:

[LO 1.9]

To plan the manufacturing of a product

Complete the following table by choosing all the materials and tools used, as well as the actions performed and write it underneath the appropriate heading.

Materials	Tools	Action

ASSIGNMENT 7:

[LO 1.11]

To compile a list of safety measures

List a few safety rules that you should have obeyed when you've used a specific tool while making your trinket box.

Example: scissors – carry with the sharp side facing downwards.

DESIGN

ASSIGNMENT 8:

[LO 1.7, 1.8]

To make a lid for your treasure chest

Design and draw different types for lids for your treasure chest in isometric. Use the 30° graph paper. Make a final choice by making a correct sign with that drawing. Also give valid reasons for your choice. Draw the lid in an open and closed position in isometric.

First designs:

Reasons:

Final choice:

Closed position

MANUFACTURING

ASSIGNMENT 9:

[LO 1.10]

To reinforce the inside of your box with cardboard

Take cardboard and measure out the five sides of the box. Cut it out and glue them to the insides of the box to reinforce it. Are all the insides of even sizes? Explain.

REASEARCH

ASSIGNMENT 10:

[LO 1.4]

To use a explanatory dictionary

Look up the word HINGE in the explanatory dictionary and write down its meaning.

ASSIGNMENT 11:

[LO 1.4]

Look around you and make drawings of different hinges in the space below. Write where you saw each hinge on the dotted line below each drawing.

DESIGN

Different ways of attaching the lid by using a hinge.

ASSIGNMENT 12:

[LO 1.5]

To attach a lid

Draw sketches or paste pictures with labels of different ways of attaching the lid by using a hinge. Mark off your final choice.

DESIGN

Reinforce the outside of your box.

ASSIGNMENT 13:

To reinforce your box

Take the 40 wooden sucker sticks and plan how you are going to glue them to the outside of your box. The whole outside, except the bottom of the box, should be covered with sticks. You are allowed to use less than 40 sticks and you are allowed to saw

some of the sticks to cover the whole outside (also the lid).

MAKING

ASSIGNMENT 14:

[LO 1.10]

Attach the lid as well as the wooden sticks to the outside of the box. Work neatly and sparingly with the glue. Cut the sticks shorter with a craft knife and safety ruler on a suitable surface. Be careful not to hurt yourself. Snap the sticks by cutting one side, folding them over, cut the other side and snapping them individually. Sand the edges with sandpaper before you glue them onto the box. Position the sticks and paste them together with masking tape if you need to cut a lot of sticks the same length.

RESEARCH

ASSIGNMENT 15:

[LO 1.8]

Draw or paste pictures of different types of closing mechanisms. Add labels.

Decorate the outside of your box by spraying.

ASSIGNMENT 16:

[LO 1.10]

To decorate your box

Decorate the outside of your box by spraying/ printing a pattern/ sandblasting/ wire brushing/ painting it and varnishing it. Decorate it any way you wish. Add the closing mechanism and glue some material to the inside of your trinket box.

EVALUATION

ASSIGNMENT 17:

[LO 1.14]

Sketch the finished model/product in colour and in isometric. Use the 30° graph paper.

ASSIGNMENT 18:

[lo 1.14]

Make an orthographic drawing (3 elevations) of your finished product. Indicate the exact measurements (height, length, width, radius, diameter of lid).

- Overhead elevation
- Front elevation
- Side elevation

Assessment

Learning outcomes (LOs)

LO 1

Technological processes and skillsThe learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technology.

Assessment standards (ASs)

We know this when the learner:

investigate:

1.4 during investigations, plans a strategy for

collecting data and information.

design:

1.5 writes or communicates a short and clear statement or a design brief for development of a product or system related to a given problem, need or opportunity;

1.6 lists product and design specifications and constraints for a solution to a given problem, need or opportunity based on some of the design key words.

1.7 generates at least two alternative solutions and annotates the ideas;

1.8 chooses possible solutions, gives sensible reasons for choice, and develops a chosen idea using graphics or modelling techniques;

make:

1.9 develops a plan for making details .

1.10 chooses and uses appropriate tools and materials to make products by measuring, marking, cutting or separating, shaping or forming, joining or combining, and finishing different materials with some accuracy;

1.11 use safe working practices and shows awareness of efficient ways of using materials and tools;

evaluate:

1.12 evaluates the product or system based on criteria linked directly to the design brief and some of the specifications and constraints, and suggests improvements or modifications;

communicate:

1.14 presents ideas (in a project portfolio) using two-dimensional or three-dimensional sketches, circuit diagrams or systems diagrams.

LO 2

TECHNOLOGICAL KNOWLEDGE AND

UNDERSTANDING The learner will be able to understand and apply relevant technological knowledge ethically and responsibly.

Assessment standards (ASs)

We know this when the learner:
structures:

2.1 demonstrates knowledge and understanding of structures.

processing: 2.2 demonstrates knowledge and understanding of how materials can be processed to change or improve properties (e.g. strength, fire resistance, waterproofing, taste, volume, texture).

We know this when the learner:
impact of Technology:

3.2 expresses some reasons why products of technology affect the quality of people's lives positively and negatively.